

Canada, Northwest Territories and Yukon Affairs
Affaires du Nord-Ouest et du Yukon

THE NORTHWEST TERRITORIES

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ADMINISTRATION, RESOURCES AND
DEVELOPMENT





Above—*Fort Smith, showing the Slave River and rapids in background.*

Outside front cover—*Upstream view of the site of hydro-electric power development on the Snare River, looking northeast.*

Outside back cover—*The settlement of Arctic Bay, northern Baffin Island. King George V Mountain in background.*

Below—*Town of Yellowknife. New townsit area in foreground and original settlement in background.*



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CANADA
DEPARTMENT OF MINES AND RESOURCES

The Northwest Territories

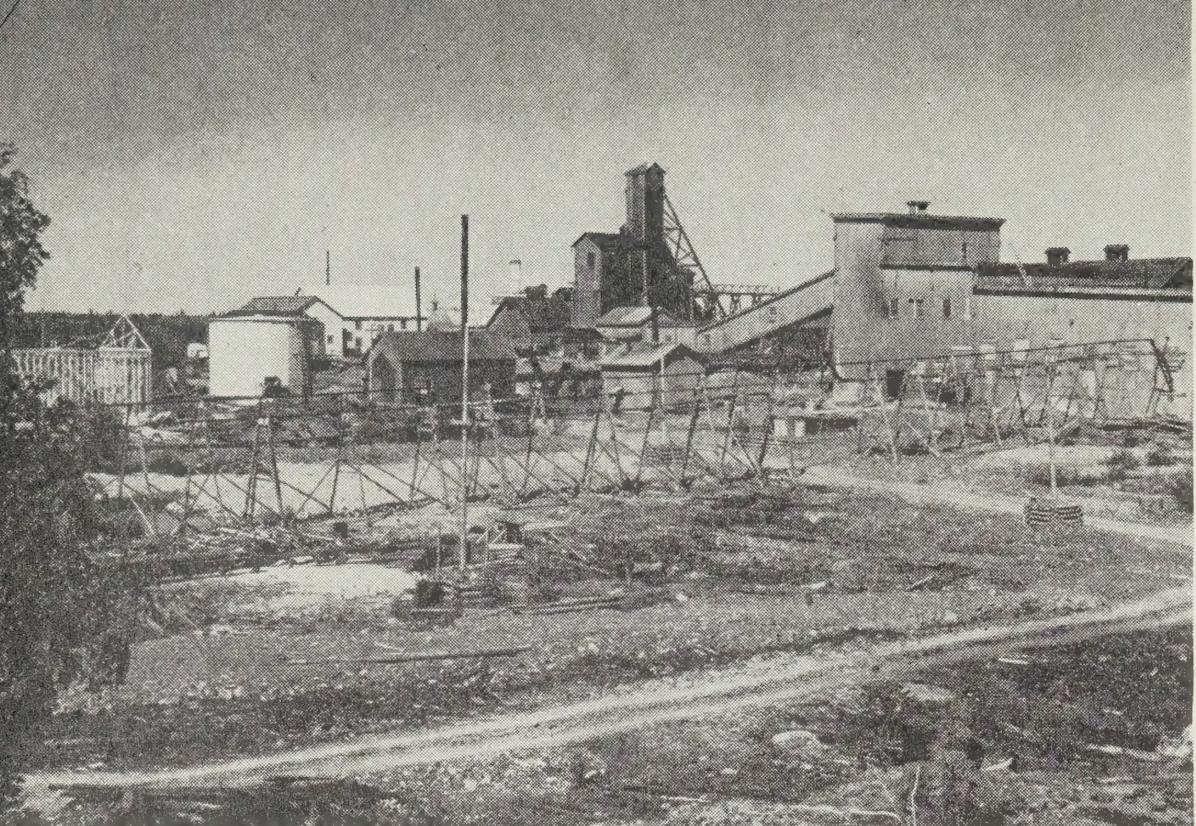
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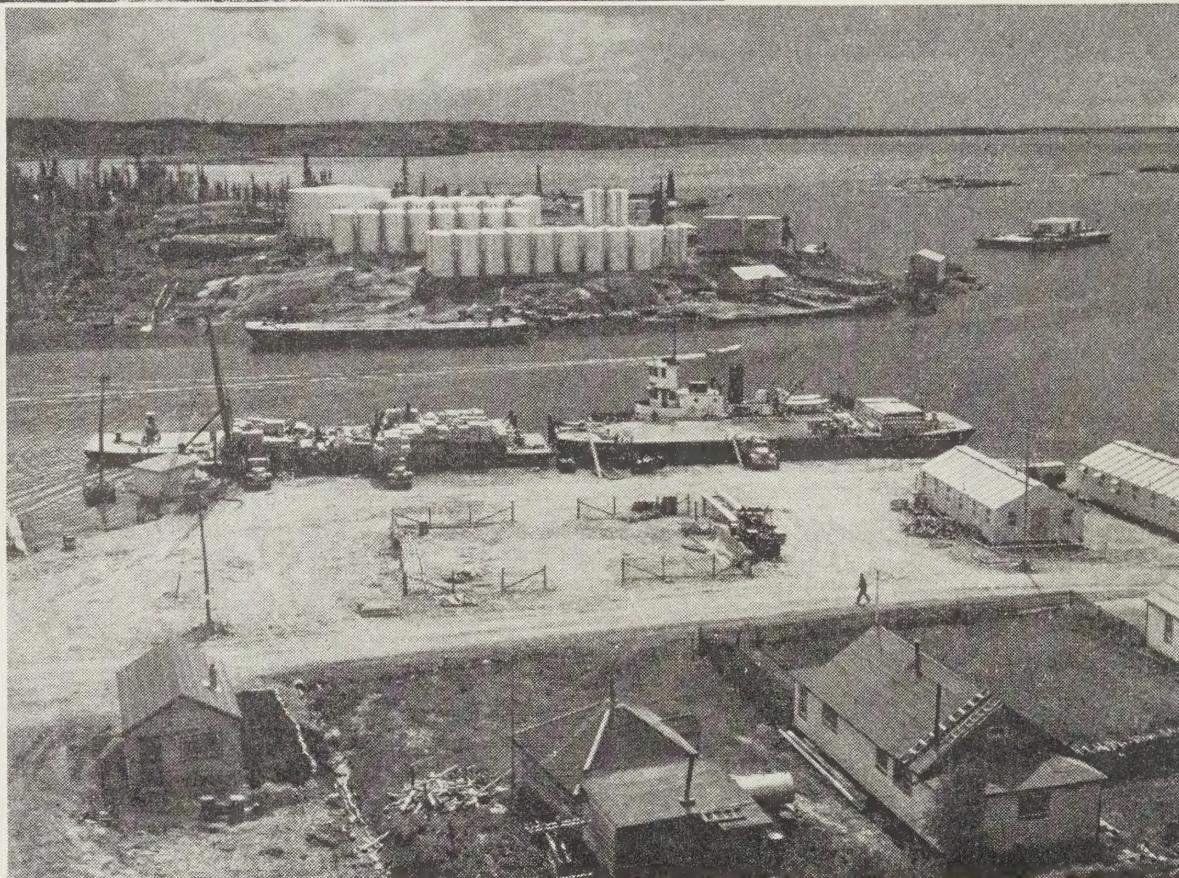
NORTHWEST TERRITORIES AND YUKON SERVICES
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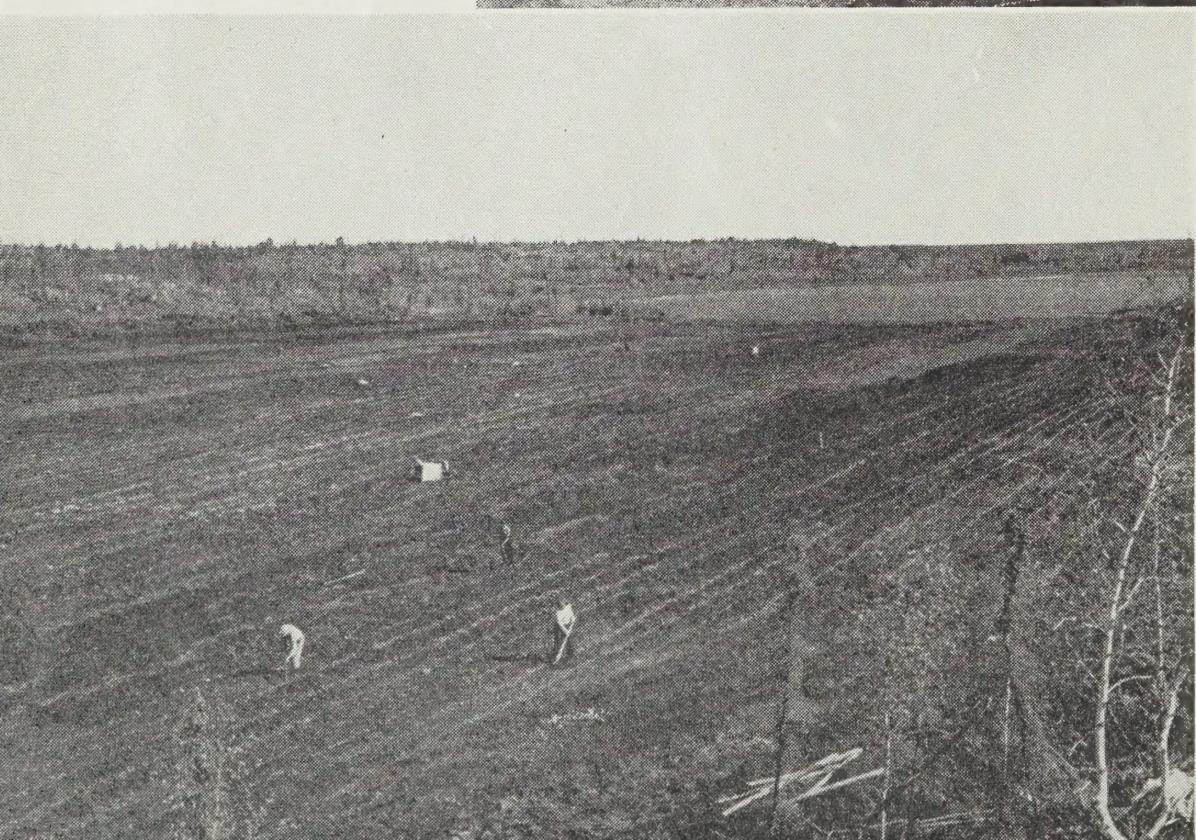
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*General view
of Negus Gold Mines,
Limited property,
showing headframe
and mill.*



*Unloading freight
from barges
at Yellowknife.
Oil storage
on Jolliffe Island
in background.*



*A 16-acre market
garden on the out-
skirts of Yellowknife.*

FOREWORD

This publication, a summary of general information on the Northwest Territories, has been compiled in the Northwest Territories and Yukon Services at Ottawa. Acknowledgment is made of the co-operation of the various Canadian Government services in supplying information from their respective fields. More detailed information may be obtained by consulting the various Government reports and other references listed in and at the end of the text.

Additional copies of this booklet may be obtained on application to the Northwest Territories and Yukon Services, Lands and Development Services Branch, Department of Mines and Resources, Ottawa, Canada.

R. A. GIBSON,
Director,
Lands and Development Services Branch

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THE NORTHWEST TERRITORIES

Location—Area—Population

THE NORTHWEST TERRITORIES contain the mainland portion of Canada lying north of the 60th parallel of latitude between Hudson Bay on the east and Yukon Territory on the west, together with the islands lying between the mainland of Canada and the North Pole, including those in Hudson Bay, James Bay, and Hudson Strait. The total area of the Northwest Territories is 1,304,903 square miles, or more than one-third of the total area of the Dominion.

For purposes of organization and administration, the Northwest Territories are divided into three districts: Mackenzie, Keewatin, and Franklin. Mackenzie District, 527,490 square miles in area, includes that part of the mainland lying between the 102nd meridian of longitude and Yukon Territory. Keewatin District, 228,160 square miles in extent, includes that part of the mainland, with the exception of Boothia and Melville Peninsulas, lying between Mackenzie District and Hudson Bay, together with all islands in Hudson and James Bays. Franklin District, with an area of 549,253 square miles, includes Boothia and Melville Peninsulas and the islands in Hudson Strait and in the Arctic Archipelago, except those adjacent to the coast of Yukon Territory.

According to the decennial census of 1941, the population of the Territories was 12,028, including 2,284 whites, 4,334 Indians, 5,404 Eskimos, and 6 others. An estimate of the population made in September, 1947, placed the total at 15,201, including 5,214 whites, 4,334 Indians, 5,651 Eskimos, and 2 others (Chinese). *1951 - 16,004, white - 5,344 Indian & Eskimo 10,660*

GOVERNMENT AND ADMINISTRATION

The Northwest Territories Act (Chapter 142 R.S.C. 1927) provides for a Territorial Government composed of a Commissioner of the Northwest Territories, a Deputy Commissioner, and five councillors appointed by the Governor in Council. The Commissioner in Council has power to make ordinances for the government of the Territories, under instructions from the Governor in Council or the Minister of Mines and Resources, respecting direct taxation within the Territories in order to raise revenues, etc., and in respect to the establishment and tenure of territorial offices; the appointment and payment of officers, maintenance of prisons, municipal institutions, licences, solemnization of marriages, property and civil rights, administration of justice; and generally to all matters of a local or private nature in the Territories. The seat of government is at Ottawa.

The Northwest Territories Council is now composed as follows:

Commissioner, Hugh L. Keenleyside, Ottawa; *Deputy Commissioner*, Roy A. Gibson, Ottawa; *Members of Council*: Stuart T. Wood, Ottawa; Donald M. MacKay, Ottawa; John G. McNiven, Yellowknife; Louis de la C. Audette, Ottawa; Harold B. Godwin, Ottawa; *Secretary*, James G. Wright, Ottawa.

Council meetings are held regularly. The Council functions not only as a legislative body, but in an advisory capacity to the Minister of Mines and Resources on matters pertaining to the administration of the Northwest Territories. Careful consideration is given to matters affecting the well-being of the resident population, white and native. Appreciation of the fact that natives must, by reason of character, training, and environment, depend almost entirely on hunting and trapping for a livelihood is reflected in the provisions of the game regulations and in the large areas set aside as game sanctuaries and native game preserves.

The administration of the various Acts, Ordinances, and Regulations pertaining to the Northwest Territories is supervised by the Director of the Lands and Development Services Branch, Department of Mines and Resources, who is also Deputy Commissioner of the Northwest Territories. His office is located at 150 Wellington Street, Ottawa. The administrative office for Mackenzie District is at Fort Smith. The main office for the transaction of mining business is at Yellowknife.

The Northwest Territories are not represented in the Parliament of Canada at present. However, in 1947, the electoral district of Yukon was enlarged by the addition of that part of Mackenzie District, Northwest Territories, lying west of the 109th meridian of longitude. The new electoral district, known as Yukon-Mackenzie River, will be represented in Parliament following the next Federal election.

The Yellowknife Administrative District was established on October 1, 1939, under the provisions of the Local Administrative District Ordinance. The affairs of the District are managed by a Local Trustee Board of nine members. The chairman and three members of the Board are appointed for a period of one year by the Commissioner of the Northwest Territories. The remaining five members are elected annually by residents of the District. The Board functions in a manner similar to that of a town council, with authority to assess real property and raise taxes for municipal purposes, including maintenance of schools, roads, sidewalks, and water, sewer, and sanitation services.

The enforcement of law and order is the responsibility of the Royal Canadian Mounted Police, and detachments are established at strategic points throughout the Territories. By means of extensive patrols, both in winter and summer, a reasonably close check is kept on a very large region by a comparatively small body of men. Detachments of Royal Canadian Mounted Police in the Territories are stationed at Aklavik, Arctic Red River, Cambridge Bay, Coppermine, Fort Good Hope, Fort Liard, Fort Norman, Fort Providence, Fort Resolution, Fort Simpson, Fort Smith, Norman Wells, Port Radium, Rae, Reliance, Yellowknife, Baker Lake, Chesterfield, Coral Harbour (Southampton I.), Dundas Harbour, Eskimo Point, Frobisher Bay, Lake Harbour, Pangnirtung, and Pond Inlet.

SOCIAL SERVICES

Medical and Hospital Services

THE WELFARE of the Indian, Eskimo, and indigent white and half-breed population of the Northwest Territories and of the Ungava region of Quebec is a responsibility of the Department of Mines and Resources. The medical care and hospitalization of Indians and Eskimos, however, are responsibilities of the Indian Health Services of the Department of National Health and Welfare.

Hospitals or nursing stations are operated at a number of settlements in the Northwest Territories and in Arctic Quebec. The greater number of these institutions are maintained by missions of the Church of England in Canada and the Roman Catholic Church; the others by the Department of National Health and Welfare and the mining industry. Hospitals operated by the Church of England missions are situated at Hay River (nursing station) and Aklavik, in Mackenzie District, and at Pangnirtung on Baffin Island, Franklin District. Roman Catholic missions operate hospitals at Fort Smith, Fort Resolution, Rae, Fort Simpson, and Aklavik in Mackenzie District, and at Chesterfield in Keewatin District. Nursing stations are

maintained by the Indian Health Services of the Department of National Health and Welfare at Fort Norman in Mackenzie District, and at Fort Chimo and Port Harrison in Arctic Quebec. Plans are under way for the establishment of similar services at Lake Harbour, Baffin Island, and at other Arctic settlements.

Small hospitals are maintained by the Consolidated Mining and Smelting Company of Canada Limited at Yellowknife; by Eldorado Mining and Refining (1944) Limited at Port Radium; and by Imperial Oil Limited at Norman Wells, in Mackenzie District. These hospitals are in charge of resident doctors retained by the companies. The construction of a new 40-bed hospital was completed in 1947 at the settlement of Yellowknife, to the cost of which the Dominion Government is contributing a substantial share. This institution, designed to serve the Yellowknife mining region, is expected to be available for use in 1948.

The mission hospitals have accommodation varying from 10 to 50 beds, possess surgical facilities and, in most cases, X-ray equipment, and are in charge of resident doctors and graduate nurses. The nursing stations at various settlements are in charge of qualified nurses. Industrial homes for the aged and infirm are operated in connection with the mission hospitals at Aklavik, Chesterfield, and Pangnirtung.

The Government of Canada has contributed substantially toward the construction costs of some of the mission hospitals, and also pays the missions a daily allowance at an established rate for each native, indigent white, or half-breed patient receiving treatment. All doctors, except those employed by the mining companies, are full-time employees of the Department of National Health and Welfare and serve as medical health officers for the district in which they are located. In the Mackenzie District, some of them also serve as Indian Agents. The doctor attached to the Con mine at Yellowknife serves part time as local medical health officer. The doctors located at the various settlements and posts in the Territories also serve the resident white population on a free basis.

In 1947, doctors attached to the Department of National Health and Welfare were located at Fort Smith, Fort Resolution, Fort Simpson, and Aklavik, in Mackenzie District; Chesterfield, Keewatin District; and Pangnirtung, Franklin District. Doctors maintained by the mining companies were located at Yellowknife, Port Radium, and Norman Wells.

The department of National Health and Welfare serves as a consulting agency in matters of public health, nutrition, and sanitation. All doctors in the Territories have recourse to the medical services of that Department in dealing with complicated cases or epidemics, and any information required immediately is usually transmitted by radio through Government or private commercial stations. At trading posts or settlements where medical services are not available, medical advice may be obtained in emergencies by radio from the medical officer for the district, or from the Department at Ottawa. Some medical supplies are furnished at Government expense to mission hospitals and to distributors in most of the remote settlements.

A qualified doctor accompanies the annual patrol of settlements and trading posts in the Canadian Eastern Arctic, and examines the natives at all ports of call. During the past two years, these examinations have included chest X-rays and a survey and treatment of Eskimo vision. A dentist also accompanies the patrol and serves those requiring treatment.

Dental services in Mackenzie District are provided by a dentist at Yellowknife and by dentists who visit the Territories from time to time.

Education

The education of the white, native, and half-breed children in Mackenzie District is carried on largely at residential and day schools operated under the supervision of the Dominion Government by missions of the Church of England in Canada and the Roman Catholic Church. Located in the principal settlements, these schools were constructed by, or with the assistance of, the Dominion Government, and their maintenance is assisted by annual grants from the same source. In addition, the Northwest Territories Administration furnishes liberal quantities of school supplies and equipment. Residential schools are operated by the Church of England mission at Aklavik, and by the Roman Catholic missions at Fort Resolution, Fort Providence, and Aklavik. Day schools are located at Port Brabant, Fort Norman, Port Radium, Fort Smith, and Fort Simpson.

A fine modern public and high school building has been completed at Yellowknife, and is designed to serve as a school of opportunity for school children residing at other settlements in the Territories. The Yellowknife school is the only one in the Territories maintained chiefly by local taxation and administered by a local school board. A non-denominational school at Fort Smith is maintained by fees and grants. In addition, a day school for Indian children is operated at Fort McPherson by the Indian Affairs Branch of the Department of Mines and Resources.

Public and high school students in remote areas of the Territories have access to correspondence study courses issued by the Alberta provincial educational authorities. The costs of providing these courses for residents of the Territories are borne by the Northwest Territories Administration.

Eskimo children in the Eastern Arctic are instructed at mission day schools. Because of their nomadic tendency, however, the Eskimos seldom remain very long at the settlements, and the periods available to the missions for teaching the children are therefore comparatively short. Eskimo children along the Western Arctic Coast and in the Mackenzie Delta attend the mission residential schools at Aklavik. The Eskimos of the Eastern Arctic have adopted a system of syllabic writing (geometric characters similar to a type of shorthand), which most of them can now read and write proficiently. The Administration has taken advantage of this fact to provide educational material in the Eskimo language giving advice on health and native economics for the benefit of both children and adults. It is planned to provide a measure of teaching service in connection with Government nursing stations which are to be established in Eskimo territory in the near future.

Educational matters come under the jurisdiction of the Northwest Territories Council, and on its recommendation, an Inspector of Schools was appointed in 1946. As a result of subsequent inspections made throughout Mackenzie District, the administration of education in the Territories is being re-organized and new facilities are being made available. Among the improvements planned are an extensive circuit for the regular distribution of educational films, special school radio programs broadcast to the classrooms, additional equipment and supplies, increased attention to methods of instruction, and new day schools in areas where facilities for educational instruction are not yet available.

SETTLEMENTS AND TRADING POSTS

SETTLEMENTS in the Northwest Territories range in size from surveyed townsites to small groups of buildings around trading posts or medical centres. The largest settlements are situated in Mackenzie District, and include Yellowknife, centre of the gold-mining industry; Fort Smith, administrative headquarters of the district; Aklavik, metropolis of the Mackenzie delta region, and Port Radium (Eldorado mine) on Great Bear Lake. In settlements other than Yellowknife and Port Radium, the white population is composed principally of government officers, transportation company officials, missionaries, traders, and others engaged in business. In the Eastern Arctic, the white population is largely transitory. It is formed of Government officers, missionaries, and traders, most of whom usually spend terms of five years or less at their posts before being transferred to other locations.

The townsite of Yellowknife, situated on Yellowknife Bay on the north shore of Great Slave Lake, has shown remarkable development in the last few years. Founded in 1935 following important gold discoveries in the vicinity, it is now a thriving community with a permanent population of about 3,500, which increases during the summer months. In 1945 and 1946, extensions to the townsite were made necessary by the increased demand for business and residential sites. Yellowknife is served by water and air services, and has a modern airport, local transportation services, stores, hotels, restaurants, a theatre, and a weekly newspaper. Recently, a modern public and high school, a new hospital, and a new hotel were constructed.

The larger settlements in Mackenzie District are served throughout the year by air transportation, and in summer by water transportation. Eastern Arctic settlements are serviced principally by the supply ships that carry the annual Eastern Arctic Patrol, and occasionally by unscheduled aircraft. Government and private commercial radio stations provide all-year communication at practically all settlements and posts.

In the following paragraphs will be found brief descriptions of most of the settlements and trading posts in the Northwest Territories, and those in the Provinces of Quebec and Manitoba served by the Eastern Arctic Patrol.

Aklavik, on west channel of Mackenzie River, 69 miles from Arctic Coast, Mackenzie District, N.W.T.—Resident Government Medical Officer; Stipendiary Magistrate and District Administrator; Royal Canadian Mounted Police detachment; post office; Government radio and meteorological station (Department of National Defence); trading posts; hotel; community hall; Church of England and Roman Catholic missions and hospitals; residential and day schools.

Arctic Bay, northern Baffin Island, Franklin District, N.W.T.—Winter harbour of Canadian Government Steamship "Arctic", 1909-10; Government radio and meteorological station (Department of Transport); private commercial radio station; trading post; Roman Catholic Mission.

Arctic Red River, at junction of Mackenzie and Arctic Red Rivers, Mackenzie District, N.W.T.—Royal Canadian Mounted Police detachment; post office; trading post; private commercial radio station; Roman Catholic mission.

Bache Peninsula, eastern Ellesmere Island, Franklin District, N.W.T.—Site of former Royal Canadian Mounted Police detachment and post office.

Baker Lake, at mouth of Thelon River, Keewatin District, N.W.T. — Royal Canadian Mounted Police detachment; Government radio and meteorological station (Department of National Defence); Ionospheric Station; emergency landing strip; Government scientific station; trading post; private commercial radio station; Church of England and Roman Catholic missions.

Bathurst Inlet (Burnside Harbour), Coronation Gulf, Mackenzie District, N.W.T. — Trading post; private commercial radio station; Roman Catholic mission.

Belcher Islands, Hudson Bay, Keewatin District, N.W.T. — Trading outpost.

Cambridge Bay, southern Victoria Island, Franklin District, N.W.T. — Royal Canadian Mounted Police detachment; trading post; private commercial radio station; Church of England mission.

Cape Dorset, Dorset Island, off Foxe Peninsula, Baffin Island, Franklin District, N.W.T. — Trading posts; private commercial radio station; Roman Catholic mission.

Cape Hopes Advance, Ungava Bay, Quebec — Government radio direction-finding and meteorological station (Department of Transport).

Cape Smith, Smith Island, eastern side of Hudson Bay, Keewatin District, N.W.T. — Trading post; private commercial radio station.

Chesterfield, western side of Hudson Bay, Keewatin District, N.W.T. — Resident Government medical officer; Royal Canadian Mounted Police detachment; post office; Government radio direction-finding and meteorological station (Department of Transport); trading post; Roman Catholic mission; hospital, and industrial home.

Churchill, western side of Hudson Bay, Manitoba. — Seaport terminus of Hudson Bay railway; National Harbours Board grain elevator, offices, and shops; Government airport and hospital; radio direction-finding and meteorological station (Department of Transport); Royal Canadian Mounted Police detachment; stores; Church of England and Roman Catholic missions.

Coppermine, at mouth of Coppermine River, Mackenzie District, N.W.T. — Royal Canadian Mounted Police detachment; post office; Government radio and meteorological station (Department of Transport); trading post; Church of England and Roman Catholic missions.

Coral Harbour, Southampton Island, Keewatin District, N.W.T. — Trading post; private commercial radio station; Church of England and Roman Catholic missions; Royal Canadian Mounted Police detachment; landing field; Government radio and meteorological station (Department of Transport) at Munn Bay, 5 miles distant.

Craig Harbour, southern Ellesmere Island, Franklin District, N.W.T. — Site of former Royal Canadian Mounted Police detachment and post office.

Diana Bay, Hudson Strait, Quebec. — Trading post.

Dundas Harbour, Devon Island, Franklin District, N.W.T. — Royal Canadian Mounted Police detachment and post office; former trading post.

Eskimo Point, western side of Hudson Bay, Keewatin Districts, N.W.T. — Royal Canadian Mounted Police detachment; trading post; private commercial radio station; Northern Evangelical Society Mission and Roman Catholic mission.

Eureka Sound, Slidre Fiord, western Ellesmere Island, Franklin District, N.W.T. — Government meteorological station (operated jointly by the Department of Transport and the United States Weather Bureau.)

Fort Chimo, Koksoak River, Quebec. — Royal Canadian Mounted Police detachment; post office; trading post; private commercial radio station; Church of England mission. Defence project landing field; radio and meteorological station, 7 miles distant; Ionospheric Station.

Fort Franklin, western end of Great Bear Lake, Mackenzie District, N.W.T. — Site of early Hudson's Bay Company fort used by Franklin expedition as winter headquarters 1825-26-27. At present a trading post.

Fort Good Hope, at junction of Mackenzie and Hare Rivers, Mackenzie District, N.W.T. — Royal Canadian Mounted Police detachment; post office; trading post; Government radio and meteorological station (Department of National Defence); private commercial radio station; Roman Catholic mission.

Fort Liard, on Liard River, near point where Yukon-Northwest Territories boundary intersects northern boundary of British Columbia, Mackenzie District, N.W.T. — Royal Canadian Mounted Police detachment; trading post; private commercial radio station; Roman Catholic mission.

Fort McKenzie, Koksoak River, Quebec. — Department of Transport station; Indian settlement.

Fort McPherson, on Peel River near junction with Mackenzie River, Mackenzie District, N.W.T. — Post office; trading post; private commercial radio station; Church of England mission.

Fort Norman, at junction of Great Bear and Mackenzie Rivers, Mackenzie District, N.W.T. — Royal Canadian Mounted Police detachment; post office; Government radio and meteorological station (Department of National Defence); trading posts; Roman Catholic mission; transfer point for all water-borne traffic proceeding to Great Bear Lake.

Fort Providence, on Mackenzie River just west of outlet of Great Slave Lake, Mackenzie District, N.W.T. — Royal Canadian Mounted Police detachment; Government radio and meteorological station (Department of National Defence); landing field; post office; trading post; private commercial radio station; Roman Catholic mission and residential school.

Fort Resolution, on Great Slave Lake near mouth of Slave River, Mackenzie District, N.W.T. — Resident Government medical officer who is also Indian Agent, Royal Canadian Mounted Police detachment; post office; Government radio and meteorological station (Department of National Defence); landing field; trading posts; Roman Catholic mission; hospital, and residential school.

Fort Ross, on Somerset Island, facing Bellot Strait, Franklin District, N.W.T. — Former trading post.

Fort Simpson, at junction of Mackenzie and Liard Rivers, Mackenzie District, N.W.T. — Resident Government medical officer, who is also Indian Agent; Royal Canadian Mounted Police detachment; post office; Government radio and meteorological station (Department of National Defence); landing field (8 miles distant); agricultural experiment substation; trading posts; Church of England and Roman Catholic missions and day schools; Roman Catholic hospital.

Fort Smith, on Slave River just north of Alberta-Northwest Territories boundary, Mackenzie District, N.W.T.—Offices of Stipendiary Magistrate and District Administrator; Superintendent, Forest and Wildlife Management; resident Government medical officer; and Royal Canadian Mounted Police detachment. Post office; Government radio and meteorological station (Department of National Defence); landing field and seaplane anchorage; trading posts; hotel; liquor store; transportation companies; Church of England and Roman Catholic missions; Roman Catholic hospital and day school; public day school.

Frobisher Bay, southern Baffin Island, Franklin District, N.W.T.—Royal Canadian Mounted Police detachment; defence project landing field; radio and meteorological station (Department of Transport). Trading post in vicinity of settlement.

George River, Ungava Bay, Quebec—Trading post; private commercial radio.

Great Whale River, Hudson Bay, Quebec—Trading post; private commercial radio station; Church of England mission.

Hay River, on Great Slave Lake at mouth of Hay River, Mackenzie District, N.W.T.—Post office; trading post; Government radio and meteorological station (Department of National Defence); private commercial radio station; Church of England and Roman Catholic missions; Church of England nursing home; terminus of winter road from Grimshaw, Alberta, now developed into an all-weather highway; landing field.

Holman Island, (King's Bay) Amundsen Gulf, Franklin District, N.W.T.—Trading post; private commercial radio station; Roman Catholic mission.

Igloolik, on island in Foxe Basin, northeast of Melville Peninsula, Franklin District, N.W.T.—Trading post; Roman Catholic mission.

Ivugivik, Hudson Bay, Quebec—Roman Catholic mission.

Koartak, immediately adjacent to Cape Hopes Advance, Ungava Bay, Quebec.—Roman Catholic mission.

Lake Harbour, southern Baffin Island, Franklin District, N.W.T.—Royal Canadian Mounted Police detachment; post office; trading post; private commercial radio station; Church of England mission.

Maguse River, mouth of Maguse River, Keewatin District, N.W.T.—Trading post.

Mansel Island, Hudson Bay, Keewatin District, N.W.T.—Former trading post.

Moffet Inlet, Admiralty Inlet, northwestern Baffin Island, Franklin District, N.W.T.—Church of England mission (unoccupied at present).

Norman Wells, on Mackenzie River, 48 miles north of Fort Norman, Mackenzie District, N.W.T.—Oil wells, first drilled in 1920, and refinery, erected in 1939, supply most of petroleum requirements of mining camps in Mackenzie District. Royal Canadian Mounted Police detachment; post office; landing field; trading post; Government radio and meteorological station (Department of National Defence); hotel; hospital.

Nottingham Island, Hudson Strait, Franklin District, N.W.T.—Government radio direction-finding and meteorological station (Department of Transport).

Nueltin Lake, Keewatin District, N.W.T. — Trading post.

Outpost Island, Great Slave Lake, Mackenzie District, N.W.T. — Gold-mining property.

Padlei, west of Maguse Lake, Keewatin District, N.W.T. — Trading post, serviced by aircraft from Eskimo Point; private commercial radio station.

Pangnirtung, on Pangnirtung Fiord, Cumberland Sound, eastern Baffin Island, Franklin District, N.W.T. — Resident Government medical officer; Royal Canadian Mounted Police detachment; post office; trading post; private commercial radio station; Church of England mission, hospital and industrial home.

Paulatuk, Darnley Bay, Amundsen Gulf, Mackenzie District, N.W.T. — Trading post; Roman Catholic mission.

Payne Bay, Ungava Bay, Quebec — Trading post; private commercial radio station.

Pelly Bay, Gulf of Boothia, Keewatin District, N.W.T. — Roman Catholic mission.

Perry River, on Queen Maud Gulf, Keewatin District, N.W.T. — Trading post.

Peterson Bay, (Gjoa Haven), King William Island, Franklin District, N.W.T. — Trading post.

Pond Inlet, northeastern Baffin Island, Franklin District, N.W.T. — Royal Canadian Mounted Police detachment; post office; trading post; private commercial radio station; Church of England and Roman Catholic missions.

Port Brabant, (Tuktoyaktuk), on Arctic Ocean east of mouth of Mackenzie River, Mackenzie District, N.W.T. — Exchange point for river and ocean traffic; trading post; private commercial radio station; Church of England and Roman Catholic missions.

Port Harrison, eastern Hudson Bay, Quebec — Royal Canadian Mounted Police detachment; post office; Government radio direction-finding and meteorological station (Department of Transport); trading posts; Church of England missions.

Port Radium, (Post office) Labine Point, Great Bear Lake, Mackenzie District, N.W.T. — Post office on property of Eldorado Mining and Refining (1944) Limited, a Crown company. In addition to the mine and mill, in vicinity are a Government radio and meteorological station (Department of National Defence), a Royal Canadian Mounted Police detachment, and seaplane anchorage. Port Radium post office was formerly situated at a settlement on Echo Bay, about 6 miles to the east (now abandoned).

Povungnituk, eastern Hudson Bay, Quebec — Trading post; private commercial radio station.

Rae, at head of north arm of Great Bear Lake, Mackenzie District, N.W.T. — Royal Canadian Mounted Police detachment; post office; trading post; private commercial radio station; Roman Catholic mission and hospital.

Read Island, Dolphin and Union Strait, Franklin District, N.W.T. — Trading post; private commercial radio station.

Reindeer Depot, east channel of Mackenzie River about 60 miles from mouth, Mackenzie District, N.W.T. — Headquarters for field supervision of Government reindeer industry; headquarters building, warehouses, workshop; private commercial radio station.

Reliance, at eastern end of Great Lake Slave, Mackenzie District, N.W.T.— Royal Canadian Mounted Police detachment; trading post.

Repulse Bay, southern coast Melville Peninsula, Franklin District, N.W.T.— Trading post; private commercial radio station; Roman Catholic mission.

Resolute Bay, Cornwallis Island, Franklin District, N.W.T.— Government meteorological station (operated jointly by the Department of Transport and the United States Weather Bureau); Royal Canadian Mounted Police detachment; Ionospheric Station.

Resolution Island, eastern entrance to Hudson Strait, Franklin District, N.W.T.— Government radio direction-finding and meteorological station (Department of Transport).

Richardson Island, Coronation Gulf, Franklin District, N.W.T.— Trading post.

Richmond Gulf, east side Hudson Bay, Quebec.— Trading post; lead mines.

River Clyde, eastern Baffin Island, Franklin District, N.W.T.— Government ionospheric, radio, and meteorological stations (Department of Transport); trading post; private commercial radio station.

Snowdrift, southeastern shore of Great Slave Lake, Mackenzie District, N.W.T.— Trading posts; private commercial radio station.

Stanton, at mouth of Anderson River, Mackenzie District, N.W.T.— Trading post; Roman Catholic mission.

Sugluk, Hudson Strait, Quebec— Trading post; private commercial radio station; Roman Catholic mission.

Taltson River, (Rocher River), southern shore Great Slave Lake, Mackenzie District, N.W.T.— Trading post; private commercial radio station.

Tavani, Mistake Bay, western side Hudson Bay, Keewatin District, N.W.T.— Trading post; private commercial radio station; Roman Catholic mission.

Wager Bay, on Ford Lake, west of Wager Bay, Keewatin District, N.W.T.— Former trading post.

Wakeham Bay, Hudson Strait, Quebec— Trading outpost; Roman Catholic mission.

Wolstenholme (Eric Cove), at western end Hudson Strait, Quebec— Former trading post:

Wrigley, on west bank Mackenzie River, Mackenzie District, N.W.T.— Post office; trading post; private commercial radio station; landing field about 5 miles southeast on east side of river.

Yellowknife, on north shore of Great Slave Lake, about 5 miles south of mouth of Yellowknife River, Mackenzie District, N.W.T.— Mining settlement built up as result of prospecting and mining operations in the vicinity. Contains offices of Mining Recorder, Stipendiary Magistrate, and other Canadian Government officials; Royal Canadian Mounted Police detachment; post office; Government airport, radio range and meteorological station (Department of Transport); Government radio station (Department of National Defence); private commercial radio stations; public and high school; hotels; hospital; restaurants; banks; drug stores; tavern; liquor store; general stores; meat market; motion picture theatres; weekly newspaper; printing office; Church of England and Roman Catholic Churches; has electric light, water, and sewer services; also local motor, air, and water transportation services.

TRANSPORTATION

TRANSPORTATION is one of the most important factors in the development of northern Canada. On adequate water, highway, and air transportation services depend the safe delivery of large tonnages of supplies and equipment shipped each year to the sub-Arctic and Arctic regions, and the export of furs and minerals, which are the principal products of the North.

Mackenzie District

Mackenzie District and the Western Arctic are served principally by water and aerial transportation. There is no general highway system in the Territories, although an important new road is rapidly being completed to link railhead with Great Slave Lake. Truck and tractor roads suitable for motor traffic have also been constructed in the vicinity of settlements and mining communities, and between strategic points to facilitate the transportation of freight and supplies.

Inland Water Transportation

Since the great Northwest was first opened to commerce, water transportation services have borne the heaviest share of traffic. The Mackenzie River and its tributaries, the Athabasca and Slave Rivers, provide a direct inland water transportation route for a distance of about 1,700 miles. In addition, subsidiary routes on Lake Athabaska, Great Slave Lake, and Great Bear River and Lake total more than 800 miles. The main route is continuous except for one unnavigable stretch between Fort Fitzgerald, Alberta, and Fort Smith, N.W.T. The head of this avenue of transportation is Waterways, Alberta, terminus of a branch of the Northern Alberta Railways, 300 miles north of Edmonton. From Waterways, freight and passengers are transported by water to Fort Fitzgerald, where a 16-mile portage to Fort Smith, gateway to Mackenzie District, is necessary to avoid a series of rapids on the Slave River. Northbound traffic is transferred around this obstruction by motor vehicles over well-maintained roads to wharves at Fort Smith and at Bell Rock. There is uninterrupted navigation from Fort Smith to the Arctic Ocean.

Services on the Mackenzie River route were first provided by canoes, and later by the picturesque York boats of the Hudson's Bay Company. Steamboat service on the Athabasca-Slave Rivers section of the route was inaugurated in 1884, and, in 1886, a similar service was commenced from Fort Smith to Fort McPherson. Services were also maintained on the Peace River for many years.

General freight services on the Mackenzie River system are maintained by three water transportation companies viz. the Northern Transportation Company, Limited; Yellowknife Transportation Company, Limited; and McInnis Products Corporation Limited. The Hudson's Bay Company, which for nearly half a century operated water transportation services from Waterways to the Arctic, decided at the close of the 1947 season to restrict its activities to supplying its own trading posts. The company, however, will continue to supply the Western Arctic, and will operate as a common carrier specifically from Waterways to Port Brabant (Tuktu). Freight destined for the Western Arctic Coast will be distributed from the latter point. Additional information concerning passenger and freight rates, as well as dates of sailings, may be obtained from the offices of the above-mentioned companies at Edmonton, Alberta.

All these companies have modern loading facilities and docks at their southern termini, and adequate equipment at the larger settlements for the handling of freight. Many of the boats in service burn oil, are equipped with radio, and are in regular communication with stations en route. Canoes are still used extensively on the smaller lakes and rivers, and motor boats also provide transportation at many points.

Coastal Services

For many years, the Western Arctic coast was served by ocean-going vessels from Pacific Coast seaports via Bering Strait, but for various reasons this service was discontinued. Vessels operated by the Hudson's Bay Company which connect with Mackenzie River services at Port Brabant provide freight services to points along the coast. Occasional transportation along the coast is also provided by schooners operated by traders and Eskimos.

Aerial Transportation

The use of aircraft has contributed greatly to developments in Mackenzie District. This form of transportation was first introduced during the winter of 1920-21 by Imperial Oil, Limited, and since then extensive exploration of the region has been made by air. Mackenzie District is particularly suited to the use of aircraft equipped with pontoons or skis, as it is dotted with lakes and traversed by rivers of sufficient size to permit safe landings in summer and in winter.

During the war, existing landing strips were greatly improved and many other fields developed to permit the operation of wheel-equipped aircraft throughout the year. These fields are situated at Fort Smith, Fort Resolution, Hay River, Yellowknife, Fort Providence, Fort Simpson, Wrigley, and Norman Wells. Maintenance of some of these fields, however, has since been discontinued, and those at Fort Providence, Fort Simpson, and Wrigley are not used in winter. Landing strips have been constructed on Great Bear River and at Sawmill Bay on the east side of Great Bear Lake to facilitate mining operations. The airport which serves the settlement of Yellowknife is one of the most modern in northern Canada. It is equipped with a radio range station and is capable of accommodating large passenger and freight planes.

Regular passenger, mail, and express services by air are maintained throughout the year to many points in Mackenzie District. Canadian Pacific Air Lines maintain services from Edmonton to Fort Smith and Yellowknife daily except Sunday, via McMurray. Services are also provided twice weekly to Hay River and Yellowknife via Peace River. From Yellowknife, air services are provided regularly every two weeks to Rae, Indin Lake, and Port Radium, and twice monthly to Coppermine. In addition, Fort Providence, Fort Simpson, Norman Wells, Fort Good Hope, Arctic Red River, Fort McPherson, and Aklavik have air service twice a month in summer and once a month in winter. Wrigley and Fort Norman are served from Norman Wells in summer. In winter all "down-river" settlements are served from Yellowknife. Some of these services are suspended for short periods during "break-up" and "freeze-up." Most passenger aircraft have two-way radio permitting continuous communication with stations in the Northwest Territories.

Roads

Roads in the Mackenzie District include two portage roads, each about 16 miles long, which permit travel from Fort Fitzgerald to Fort Smith, and an extension from Fort Smith to the shipyard and wharves at Bell Rock,

8 miles distant. Roads constructed in the vicinity of Yellowknife serve the airport at Long Lake, and the Con-Rycon, Negus, Giant Yellowknife, Ptarmigan, and Crestaurum mining properties. A portage road built along the Great Bear River for a distance of 8½ miles assists in the movement of freight to and from Great Bear Lake.

A recent development has been the construction of an all-weather highway from railhead at Grimshaw, Alberta, to Hay River settlement on Great Slave Lake. The work was carried out as a joint project by the Province of Alberta and the Government of Canada, with the Dominion Government bearing the entire cost of the 81-mile section within the Northwest Territories, and two-thirds of the cost of the 275 miles being built in Alberta. The route follows generally that of a winter road which has been utilized in the past for transportation of freight by tractor train. The road was opened to traffic in 1948 and is expected to facilitate the movement of freight to Yellowknife and to settlements on the Mackenzie River.

Eastern Arctic

For many years, the Eastern Arctic was served principally by R.M.S. *Nascopie*, a vessel owned and operated by the Hudson's Bay Company. Under contract to the Government of Canada, the vessel carried the annual Eastern Arctic Patrol and visited medical centres, Royal Canadian Mounted Police detachments, post offices, radio and meteorological stations, trading posts, and missions in the region. The *Nascopie* was lost, however, after it grounded on a reef in Hudson Strait, off Cape Dorset, during the 1947 patrol. Supplies for the various posts usually served by the *Nascopie* were later delivered by smaller vessels owned or chartered by the Hudson's Bay Company.

The Eastern Arctic Patrol involves a voyage of more than 10,000 miles to posts in northern (Arctic) Quebec, on the west coast of Hudson Bay, on islands in Hudson Strait and Hudson Bay, and in the Arctic Archipelago. The party, headed by the Chief of the Arctic Division, Northwest Territories Services, Department of Mines and Resources, usually includes administrative and medical officers, Royal Canadian Mounted Police personnel, technicians, and others going north to relieve those who have completed terms of service in the Arctic. Scientific parties representing various Government departments and other agencies also accompany the expedition. Ports of call are visited for inspection, administration of justice, delivery and acceptance of mail, change of personnel, and replenishment of supplies. Occasionally, Eskimo families are transferred to more abundant hunting grounds.

The patrol normally starts and finishes at Montreal, and up to 1947 called at Churchill, Manitoba, to refuel for the northbound journey and pick up passengers, mail, and freight arriving there over the Hudson Bay Railway. On the return voyage, the patrol collects fur at the various ports of call. The patrol normally extends over a period of about fourteen weeks during which about 20 calls are made by the main supply vessel and an additional 30 calls by small auxiliary vessels. The total annual mileage by all vessels and aircraft connected with the patrol usually exceeds 20,000 miles.

A radical change in transportation arrangements for the Eastern Arctic is under way. The various posts and settlements have become too numerous for one vessel to serve adequately during the short summer season, and, to meet requirements, a new vessel is now under construction for the Depart-

ment of Transport. It is expected that this vessel will patrol to Baffin Island and the more inaccessible central and northern Arctic Islands. New vessels being constructed for the Hudson's Bay Company will be used principally in servicing posts in Hudson Bay and Strait.

The Department of Transport ice-breaker *N.B. McLean* aids vessels in the navigation of the Hudson Bay Route. It enters Hudson Strait early in the season to inspect, repair, and service all aids to navigation, including buoys, lights, and radio and direction-finding stations. It also patrols the route and provides ships with information concerning ice and other conditions. The Baffin Trading Company usually charters a vessel each summer to serve its posts at Diana Bay, Cape Dorset, and Port Harrison. In 1947, a new schooner, the *Regina Polaris*, was placed in service by the Roman Catholic Church to carry supplies to its missions in Hudson Bay and Strait. In addition, small schooners operating out of Churchill and Moosonee serve the coasts of James Bay and Hudson Bay. Power boats known as "peter-heads" provide local transportation and may be found at nearly all Eastern Arctic settlements.

Commercial air services have not yet been established in the Eastern Arctic. Landing fields, however, were constructed during the war as defence projects on Southampton Island and at Frobisher Bay, on Baffin Island, to link up with bases at Churchill, Manitoba; Fort Chimo, northern Quebec; and those in southern Greenland. Landing fields at these points, and at Baker Lake, are available for use when required. Flying boats and pontoon-equipped aircraft have also been used in locating control points for future air photography and mapping operations, as well as for special or mercy flights.

Winter travel in the Eastern Arctic is carried out almost entirely by dog-teams and komatiks or sledges, a mode of travel that has been used by the Eskimos for centuries.

COMMUNICATIONS

Mail Services

Mackenzie District

MACKENZIE DISTRICT receives its mail exclusively by air. Prior to 1930, mail was carried by water in summer and by dog-team in winter. Following some experimental mail-carrying flights in 1929, mail planes were put into service and operated frequently. Later, air mail contracts were let, and definite schedules have been maintained for a number of years. Whereas, at one time, weeks and months were required to deliver mail, it is now done in a matter of hours. Postage rates have been kept as low as possible, and letters are carried by air at regular letter-postage rates, if not overweight. Parcels are subject to a higher rate than those carried by ordinary means of transport.

Fort Smith and Yellowknife have all year postal service several times each week from Edmonton, via McMurray. Fort Resolution has a weekly service and Hay River, Fort Providence, Fort Simpson, and Norman Wells receive mail twice a month. Wrigley, Fort Norman, Fort Good Hope, Arctic Red River, Fort McPherson, and Aklavik have monthly postal service from Edmonton, via McMurray. Port Radium (Eldorado) is served weekly, and Rae twice a month in summer from Yellowknife. Coppermine has a service twice a year (January and July). Post offices have been established at the above places.

In addition to the above services, mails may also be carried on commercial flights as circumstances permit.

Eastern Arctic

Post offices are located at Chesterfield in Keewatin District, Fort Ross, Lake Harbour, Pangnirtung, Dundas Harbour, and Pond Inlet in Franklin District, and Fort Chimo and Port Harrison in northern Quebec. The annual Eastern Arctic Patrol delivers mail to all post offices and arranges for vessels to collect and deliver at points without post offices through locally operated auxiliary services.

All classes of mail matter are centralized at Ottawa, and are carried by the Patrol or by auxiliary or courtesy services as opportunities arise. This travelling postal service is classified as an accounting post office and is available for post office savings bank transactions, money orders, postal notes, parcel post C.O.D. services, and current issues of postage stamps. Postal parcels originating in foreign territory addressed to Eastern Arctic residents, and on hand at the office of the Collector of Customs at Ottawa, are released for delivery by the Patrol, subject to the collection of all charges. Additional information concerning postal services may be obtained by writing to the Director of Communications, Post Office Department, at Ottawa.

Radio Services

Excellent radio services have been maintained in the Northwest Territories since 1925. High-powered stations have been installed by the Canadian Departments of National Defence and Transport at strategic points and important settlements in Mackenzie District and in the Eastern Arctic. In addition, nearly all settlements, mining communities, and trading posts are now equipped with two-way private commercial radio stations, by means of which communication may be carried on in code or by voice. Although this type of station has a limited range, messages can be relayed through the more powerful Government stations, and by this means practically every settlement or trading post in the Territories enjoys radio communication with outside points.

In the Eastern Arctic, several Government radio stations are also direction-finding stations for ocean-going vessels. The combined system of Government stations and licensed stations is also used to transmit weather reports, to obtain information in emergencies for the treatment of sick people in remote districts where medical services are not available, and to arrange for emergency aeroplane flights when necessary. Many of the Government stations are equipped with radio telephones for communicating with aircraft, river boats, and other stations having low-powered radios.

Government stations occasionally provide broadcasts of press news and personal messages for the benefit of traders, miners, missionaries, and others within their wave-lengths. For a number of years, the Canadian Broadcasting Corporation has broadcast the "Northern Messenger" program weekly during the winter months. By means of this service, relatives and friends are able to send personal messages to residents of the Northwest Territories and adjacent areas, a privilege greatly appreciated by all concerned.

CLIMATE*

THE NORTHWEST TERRITORIES have two main climatic divisions. The northeastern region, including the islands of the Arctic Archipelago, has an arctic climate. It includes all the region north of the tree-line extending in a general southeasterly direction, from the mouth of the Mackenzie River to the west coast of Hudson's Bay just north of Churchill, Manitoba. The average temperature of the warmest month is less than 50°F. Average winter temperatures are all below 32°F. The remainder of the Northwest Territories and Yukon has what is known as a sub-arctic climate, in which average temperatures for the coldest month are below 32°F., but average temperatures for the warmest months are above 50°F. Although both regions are cold in winter, the chief distinction between them is in summer temperatures, with the western sections being much warmer. The climate of this latter region is thus similar to that found in Ontario, north of Lake Superior, and in Quebec, north of the Gulf of St. Lawrence. There are local areas of arctic climate in the mountain peaks within the Continental climatic region, due to the cooler effects of altitude.

There are several controls which in the long run maintain differences between the northeastern and western districts of the Northwest Territories. In mid-winter, the entire Arctic territory is subject to periods of great cold, which are associated with the slow outflow of shallow, but extremely dry and cold domes of surface air from the Arctic Ocean by way of the Beaufort Sea. These air masses move in mid-winter up the Mackenzie Valley and spread out over the Canadian prairies before showing a tendency to drift eastward. Intermittently, these polar outbursts cease for short intervals, and warmer air from the North Pacific region or from the Bering Sea by way of the Aleutians will flow over the region, causing temperatures in the Mackenzie Valley to rise. Depending on which of these controls is most dominant, the winter of the Mackenzie District may be moderately cold or extremely cold and will vary from year to year.

At the same time, the Eastern Arctic is under the influence in mid-winter of polar airmasses moving southward from the Arctic Ocean toward Manitoba and James Bay. Passing over the large amount of cold water which moves south and eastward from the Arctic Ocean through the Arctic Islands to Davis and Hudson Straits, these air-masses remain cold as they move. Thus, winters in the Eastern Arctic are more constant with few mild periods. Occasionally, arctic air warmed off the Labrador Coast returns northward, but it affects southeastern Baffin Island only.

In summer, airmasses from the Beaufort Sea have a strong eastern component of motion and tend to move directly across the Northwest Territories to the Eastern Arctic. This cold air-drift, when combined with the influence of large bodies of Arctic water which remain cold throughout the summer in Hudson Bay and the many straits between the Arctic Islands, results in cool summers in the eastern regions. The average annual highest temperature does not exceed 50°F. north of latitude 70°.

The eastward shift of the paths of cold airmasses in summer allows warm air from the North Pacific region or from more southerly latitudes to flow north and northeastward, bringing mild weather to the Mackenzie area.

Summers may occasionally become really hot under this influence. Temperatures over 90°F. have been recorded in most summers. However,

* Compiled from information supplied by the Meteorological Division, Department of Transport, Toronto.

there are also summers when polar outbursts are more intense or more frequent, or both, and tend to follow a more westerly path. This causes cooler weather in the Mackenzie Valley but has the compensating advantage of heavier precipitation in the wheat region south of latitude 60.

The central and northern portions of the Arctic Archipelago seldom obtain any relief from purely polar conditions. Temperatures average 25° to 35°F. below zero in January and only 40° to 42°F. in July.

Because of the northern latitude of the Northwest Territories, there are long hours of daylight during the summer, and this fact is often advanced in support of agricultural possibilities in the Mackenzie Valley. However, since southern Baffin Island in the Eastern Arctic has no agriculture although in the same latitude and with the same duration of sunlight as the Mackenzie Valley, it is apparent that other climatic factors act as controls. Basically, agriculture is not possible in the Eastern Arctic because of lack of developed soil, and the coolness of the summer, which gives a short frost-free period; agriculture is possible, although somewhat precarious, in northwestern Canada because of the warm air masses which raise summer temperatures.

Contrary to general belief, snowfall is not heavy in the Northwest Territories. Because of low winter temperatures, however, snow remains on the ground for a long time. Annual precipitation of 10 to 13 inches in the Mackenzie Valley includes 40 to 50 inches of snow, which is about half of the snowfall of the Great Lakes, St. Lawrence River, and northern New England regions. Rain falls from July to October, but is not overly abundant. Precipitation is even less in the Arctic Islands and over the central Arctic mainland, averaging 6 to 9 inches, most of which falls as snow. Southeastern Baffin Island is an exception, since air from the south often rises over this area, bringing an average of approximately 8 inches of rain and 70 to 90 inches of snow.

The following comparison of mean temperatures by latitude in Canada and Europe illustrates the climatic difference between the eastern and western sections of the Northwest Territories and compares them with stations near the same latitude in Europe.

<i>Near Latitude 60°N.</i>	<i>January</i>	<i>July</i>
Fort Smith, N.W.T.	-16°F	60°F
Cape Hope Advance, N.W.T.	-9	41
Bergen, Norway.	34	58
Marieham, Finland.	27	59
<i>Near Latitude 65°N.</i>	<i>January</i>	<i>July</i>
Fort Good Hope, N.W.T.	-24°F	59°F
Pangnirtung, N.W.T.	-19	46
Uleaborg, Finland.	15	59
Jockmokk, Sweden.	6	58
<i>Near Latitude 75°N.</i>	<i>January</i>	<i>July</i>
Craig Harbour, N.W.T.	-22°F	41°F
Bear Island (off Norway).	15	40
<i>Near Latitude 80°N.</i>	<i>January</i>	<i>July</i>
Bache Peninsula, N.W.T.	-27°F	41°F
Quade Hook (Spitzbergen)	7	40

Until recent years, meteorological records of settlements and trading posts in the Northwest Territories were quite limited. Most of the radio stations now operated by the Departments of National Defence and Transport also serve as weather stations, and comparative records covering longer periods are gradually being acquired. The most recent development in the far north has been the establishment of meteorological stations which are operated jointly by the Canadian Department of Transport and the United States Weather Bureau.

ABORIGINES

Indians

MOST of the 4,000 Indians in the Northwest Territories live in the valley of the Mackenzie River, the principal tribes being the Chipewyan, Beaver, Sekani, Slave, Yellowknife, Dogrib, Hare, Nahanni, and Kutchin or Loucheux. The Kutchin Indians, native to the Yukon and Alaska, are found in the Northwest Territories only in the Lower Mackenzie and Peel Rivers regions. They constitute one branch of the Athapaskan stock. The remaining tribes of the Northwest Territories may be regarded as constituting another branch because their languages are mutually intelligible, whereas that of the Kutchin is distinct although obviously related.

Some scientists hold the view that the Athapaskan language, spoken by the Indians throughout the whole basin of the Mackenzie River, belongs to the same family of languages as prevails in China, Tibet, and Siam. Moreover, from the concentration of the Athapaskans in the northwestern part of America, they conclude that these people were the last wanderers to drift from Asia across Bering Strait into the New World, probably toward the beginning of the Christian era. From the Indians themselves, of course, no accurate knowledge can be gained of their origin or early movements. Their oral traditions are quite unreliable, for they combine with impossible fables memories of events which occurred no more than 150 years ago.

The present day Athapaskan has copied the dwelling and the clothing of the white man. The old-fashioned moccasin, however, holds its ground, though ornamented with beads instead of with porcupine quills; and the old fur or leather mittens, often similarly ornamented, are still preferred to ordinary gloves.

Intertribal raids came to an end about a century ago, and the Indians began to congregate about the posts and settlements of the fur-traders, who tried, not very successfully, to elevate the most influential and reliable hunters as chiefs and to give them a limited authority over their countrymen. Missionaries have introduced new and larger ideas of life and its purpose that partly supplant, partly coalesce with, the older notions. In consequence, every Indian in the Territories now adheres to the Anglican or the Roman Catholic faith, though he may still harbour many of his old beliefs. In recent years, exploration, settlement, and mining activities have led to a demand for Indian guides, canoe-men, and packers, and resulted in an increasing dependence on flour, beans, bacon, and other imported foods instead of on the rewards of hunting and fishing. From the earliest times, too, many white traders and trappers have taken Indian women as wives, and more or less consciously have leavened the whole outlook and manners of the tribes among whom they have resided. So great, indeed, has been this intermarriage that today in the whole area there are probably few Indians of pure stock.

Thus, through economic and social changes, both the outward and the inward lives of the Indians have altered. Over a long period — most of the nineteenth century — these changes threatened to bring about the extinction of the race. Alcoholic excesses and diseases previously unknown, particularly smallpox, tuberculosis, and influenza, decimated their ranks and reduced their number from what was estimated by some authorities to be 13,000 to one-third of that total. Nevertheless, the outlook for the future has become much more promising. It is confidently felt that increasing settlement, and a great development of the resources of the Territories, will open up new avenues of employment for the Indians, lower their heavy infant mortality,

and, through a general improvement in the living conditions, arouse in them new vigour and new ambitions.

The Indians of the Northwest Territories depend mostly upon hunting and trapping for a livelihood. Here and there some cultivate small plots of potatoes. They own no cattle or horses, travelling by boat along the great waterways in the summer and by dog-team in the winter. In summer, they catch and preserve large quantities of fish and pick and dry large quantities of wild berries for winter use. They live in log cabins in the winter and in tents and tepees in the summer. Like Indians of other parts of Canada, they are under the care of the Dominion Government, and their affairs, with the exception of medical care, are administered by the Indian Affairs Branch of the Department of Mines and Resources, Ottawa. The Indian welfare program in the Territories consists in the main of the provision and protection of their means of livelihood; medical care and hospitalization of the sick; education of the children; payment of treaty money; payment of family allowances in kind; provision of relief rations for the old and physically incapacitated; and the furnishing of supplies and equipment which particular circumstances may require.

Anything that interferes with the success of their hunting and trapping causes hardship and destitution. Special game preserves have been set aside for the exclusive use of Indians and Eskimos, a plan that has proved satisfactory both in game conservation and as a protection for the natives.

Since November 1, 1945, the Indian Health Services of the Department of National Health and Welfare have been responsible for the medical care and hospitalization of Indians and Eskimos. Doctors employed by that Department are stationed at Fort Smith, Fort Resolution, Fort Simpson, and Aklavik in Mackenzie District; Chesterfield Inlet in Keewatin District; and Pangnirtung in Franklin District. In addition to acting as medical health officers for the district in which they are located, these doctors also serve the local hospitals. Some of them also act as Indian Agents in Mackenzie District.

In the more remote places, medical supplies are issued to missionaries and other laymen, who render the best service they can to ailing Indians. In the hospitalization of the sick, full use is made of the hospitals operated by the Anglican and Roman Catholic missions at Fort Smith, Fort Resolution, Fort Simpson, Aklavik, and Rae, in return for which grants, based on established per diem rates, are made by the Government to the missions.

To meet the educational needs of Indian children, the Government has established residential and day schools, particulars of which will be found in the section dealing with education on page 8.

Eskimos

The Eskimos in Canada inhabit the Arctic mainland coast from the Yukon-Alaska boundary to the coast of Labrador, the southern islands of the Arctic Archipelago, some of the islands in Hudson and James Bays, and part of the interior west of Hudson Bay. The Canadian Eskimo population is approximately 7,650. Of this number, about 5,650 Eskimos are found in the Northwest Territories, and the greater part of these live in the Districts of Franklin and Keewatin. There are also about 2,000 Eskimos in northern Quebec, the former Ungava District of the Northwest Territories.

There are no Eskimo tribes as the term "tribe" is associated with North American Indians, but the Eskimos of the Eastern Arctic live and travel in bands or groups of two or more families, and each band or group usually contains some outstanding individual who acts as leader.

Because of this lack of tribal organization and the fact that native Eskimo names are not only difficult to record accurately but are quite often duplicated, the Northwest Territories Administration distributed numbered discs in 1941 to all Eskimos in Canada. This distribution was carried out in conjunction with the decennial census of the Dominion, and to the census record of each Eskimo was added a number corresponding to that on the disc issued to that individual. Through this system of numbers, the Department now has a personal record of each Eskimo. The numbered discs worn by the Eskimos permit positive identification at all times and help overcome difficulties formerly experienced in the identification of an individual whose name, for various reasons, created confusion. The new system of identification also facilitates the administration of affairs relating to the welfare and health of the Eskimos.

Contacts between the bands are limited mainly to the natives hunting or trapping in adjoining areas. Each band secures its livelihood in its own district, which has no definite boundaries, and bands move about in accordance with the movement of the game and the changing season. In bad seasons it may become necessary to look for new hunting grounds, but Eskimos are very likely to return to the old districts when they think conditions have improved. The sea furnishes the greater part of the food, fuel, and clothing of the coastal Eskimos. Those living in the interior of Keewatin District subsist chiefly on caribou.

Because of outside influences and the shortage of native clothing material, the dress of the Eskimos has undergone change in recent years, the extent of the change depending on the game resources of the particular district. Summer clothing is cut very much on the same pattern as that for winter. Caribou skin is without doubt the most suitable clothing material for winter travel, being light and warm. In the very cold weather, two suits are worn, one with the hair turned in and the other with the hair turned out. In the summer, the clothing is usually made of sealskin or of some cotton goods, such as "moleskin". High sealskin boots or moccasins are worn both summer and winter. The women make most of the clothing, and the portable type of sewing machine is a common article of equipment.

The Eskimos of the Eastern Arctic live in snow houses in winter and tents in summer. Sealskin, canvas, sacking, pieces of board, stone, and even glazed sash may go to make up the tents or houses.

The igloo is the typical winter dwelling. It is constructed of blocks cut from the hard-packed snow, and above the first row the blocks are laid spirally to form a dome. It has a low, tunnel-like entrance, and often several compartments, which are connected by tunnels. One section of the igloo floor is higher than the rest, and is used as the sleeping platform. The stone seal-oil lamps, which are kept burning day and night during cold weather, raise the temperature noticeably and make the dwelling quite comfortable. The temperature is partly controlled by means of a ventilation hole in the roof. Many igloos are lined with canvas or sealskin to prevent drip.

The nature of the summer and winter dwellings, aside from wooden or composite houses, does not restrict the Eskimos' movements to one locality, which is fortunate from the viewpoint of health and sanitation. The type of habitation depends upon local and seasonal conditions. In the Western Arctic, whenever possible, the Eskimos have "permanent" homes, in which they reside in winter. They use driftwood for fuel and for the construction of one-roomed log huts. The Hudson's Bay Company and the Royal Canadian Mounted Police frequently provide their native servants with small homes of wooden construction for use as winter residences. These are regularly inspected and kept in a sanitary condition.

Eskimos travel by boat in summer, and by dog-team in winter. The usual type of cruising boat is the open whaleboat, to which a sail is attached. Other types are also brought in on order by the trading companies and are equipped, when the owners can afford it, with gasoline engines. Eskimos are mechanically-inclined and with a little coaching quickly learn to run, take down, and keep in repair quite complicated marine engines. They know thoroughly the districts in which they hunt and trap, also the actions of the tides, currents, and ice, and go out to sea under conditions which would keep many white men ashore. Into these boats will crowd three or four families and all their dogs and equipment. The natives seem to travel in the picnic spirit and consider a trip something of a lark. They may get into serious difficulties, but once the difficulties are overcome they are forgotten.

The one-man kayak is still used extensively by the Eskimos and is probably the outstanding article of equipment made by these remarkable people. The frame is made of wood, strongly laced together with thong. The craft is narrow, is covered with sealskin, and is usually from 15 to 20 feet long. As the deck is also covered with sealskin, the kayak is quite seaworthy in the hands of an experienced Eskimo. It is propelled by a double-bladed paddle, and carries all the equipment necessary for the hunting of seals. It is usually towed behind a large boat or hoisted up on the deck when the family or families are on the move.

The sledge or komatik used in the Eastern Arctic will support loads of one thousand pounds or more, depending on the size, and will stand considerable hard usage. It is drawn by teams of Eskimo dogs or "huskies."

Dog feed is a problem at times, and is one of the matters in which Eastern Arctic Eskimos are provident. They know that their own livelihood during the long winter months depends in large measure on their dogs. A certain amount of meat is cached away during the late summer, but it is seldom sufficient and may not be readily available. Eskimo dogs are able to go for some time without food, and if the hoped-for game does not materialize for a few days no harm results. Walrus meat is considered to be the best dog food. Seal meat and some types of fish are also good.

Practically the sole medium of exchange used by the Eskimos in their dealing with traders is the pelt of the white fox. During a good fox year, the Eskimos are able to replace their worn-out gear, and satisfy their longing for new goods. The Eskimos do not, as a rule, buy luxuries until they have obtained the essentials they require. In this they are encouraged by the better traders. Very few Eskimos are able to accumulate much in the way of worldly goods or to establish credits at the trading posts; in fact, allowing a credit to stand at a trading post is something that the average Eskimo cannot comprehend. The traders, of course, depend entirely on the natives for the pelts they want, and must see that they are looked after in bad times. Seal, walrus, and caribou are also of great importance to the Eskimos. Arctic char (sea trout) is fairly abundant at the mouths of rivers during July and August, and cod may be caught in quantity at the right season in certain localities.

Domestic relationships are usually happy. Eskimos are fond of children, but large families are not common, although infant mortality is low. If they have no children of their own, they will adopt those of others, caring for them as if they were their own. They also accept without visible or audible protest the responsibility of looking after their aged and otherwise dependent relatives. A refusal to continue to furnish food to those in want, even though the needy ones show little tendency to go out and hunt for themselves, is likely to be frowned upon by the rest of the band.

The Eskimos are quite trustworthy, and are invaluable companions in Arctic travel. As employees of white men, they are likely to obey orders without question even though they think the orders are bad. This sometimes results in misunderstanding on the part of white men who are unfamiliar with this trait of Eskimo character and are not very specific in giving their orders. Both men and women are intelligent and quick to imitate or learn, and possess a mechanical turn of mind that permits them to take rapid advantage of mechanical power and labour-saving devices. Their outlook on life is cheerful, and their dispositions are friendly.

The duties of the Eskimo women are arduous and varied. They must pitch the tents when a new camp-site is occupied; cook the meals; scrape and dress skins for clothing, harness, and lines; make the clothing for the family, and keep it in repair. On the men falls the responsibility of keeping the family supplied with food and the skins out of which clothing may be made. They must also secure the fox pelts so that trade goods may be obtained from the posts. Much of their time is spent hunting seals, the staff of life of the coastal Eskimos. During the summer, when kayaks can be used, seal hunting usually does not entail very much hardship. During the remainder of the year, when the seals are obtained at the floe edge or at "breathing holes" in the ice, it calls for the exercise of considerable patience and ingenuity under very trying conditions. The walrus is usually hunted in the water from the larger boats, or on islands. Although most Eskimos have a walrus or seal harpoon, the rifle is commonly used.

Caribou hunts are arranged in the autumn particularly for the hides which are required for winter clothing. In the Eastern Arctic, it is usually necessary to go some distance inland for caribou, and two months or more may be spent in travelling and hunting. Dogs are taken along to help "pack" the meat and hides. A good pack-dog can carry a load of 35 to 40 pounds. Surplus hides or meat are cached under rocks and picked up when winter travel with sledges is possible.

In the Western Arctic, the Eskimos spend most of their time along the coast, but go inland on hunting expeditions, chiefly for caribou. There is a short season of open water in midsummer, but for eight months of the year the sea is frozen over; thus the Arctic Ocean itself provides a happy hunting ground for the Eskimos, over which they travel and live as if it were solid ground. The Eskimos move out on the ice to the sealing grounds, and it is then that many of them use the snow-house. These sealing camps may be from 5 to 20 miles out on the ice, and are frequently used as bases for trapping operations.

In some regions, as summer makes its appearance, whale boats are put in order, and with the first open water the Eskimos proceed to the whaling grounds, where they fish for white whale. A successful whaling season means prosperity for all. The flesh of the white whale is used for both human and dog food. The oil is extracted from the blubber and is stored in barrels or sealskin bags for use as part of the meals in the winter. Natives who do not possess whale-boats carry on their fishing and whaling from the shore.

The habits and culture of the Eskimos in Canada vary according to environment. The Eskimos in the Mackenzie delta region have been more affected by the influences of civilization than those living elsewhere. Many of the former are relatively prosperous, own schooners, wear white men's clothing much of the time, and are able to carry on business with traders with ease. Eskimos of the Central Arctic, who have been relatively inaccessible by boat owing to ice conditions which hinder transportation, still retain much of their primitive culture and depend greatly on the resources of land and sea for their food, clothing, and utensils. The Eskimos of the Eastern Arctic

are in a stage of civilization midway between that of Central and Western groups. While able to obtain many of the implements and utensils of the whites, these Eastern Arctic Eskimos have clung to much of the old mode of living, and thus have successfully adapted themselves to their particular environment.

For generations, the Eskimos of Canada have lived in a country in which only a hardy and intelligent race could survive. They are slowly assimilating a certain amount of civilization while still retaining their independence, pride, and ability to care for themselves. Most of them now appreciate the value of conserving the natural resources of the country in which they live, and co-operate in that work to a marked degree. Even though they may not always quite understand its meaning and purpose, the natural tendency of the Eskimos is to obey the law. Their communal life has taught them that the wishes of the individual must be subordinate to the good of the majority, and this has made them especially easy to deal with. For a number of years, the Government of Canada has been paying special attention to its Arctic citizens, in order to keep them independent, self-reliant, and self-supporting, and with this object in view has put forth continuous efforts to preserve the natural resources of the country.

FLORA

Forests

HERE is no forest industry in the usual sense of that term in the Northwest Territories, nor is there any prospect of such an industry developing on a considerable scale. What forests there are, however, should be sufficient to meet the needs of the residents in perpetuity, provided reasonable protection from forest fires is afforded. The principal tree species are aspen and balsam poplar, white and black spruce, white birch, tamarack, and jack pine. The eastern part of the Territories is practically devoid of forests, but in Mackenzie District there are several areas of forested land, varying in nature from scattered clumps of stunted conifers and birches near the northern limits of tree growth to fairly heavy stands of poplar and spruce in the vicinity of the larger rivers. These forests are of value chiefly as a source of building materials and fuel for use by the local population, and as a favourable environment for fur-bearing and game animals.

Owing to the high cost of transportation, most of the lumber used in the Northwest Territories is manufactured locally. Small sawmills, usually equipped with planing machines, are operated at various points on the Slave River, Great Slave Lake, and the Mackenzie River. Most of the lumber sawn is white spruce, and the wood of this species is used for all parts of buildings. It is also in demand for boat-building and for almost every other purpose for which lumber is used.

The limited supplies of tamarack, because of the toughness and durability of this species, are well adapted for use in certain parts of boats and make excellent ground sills for buildings. White birch is used by the natives for snowshoe frames and for framing canoes, although its bark has been largely superseded by canvas for canoe covering. Black spruce is occasionally sawn in small quantities, and this species and jack pine are used in the construction of log cabins. The poplars are used chiefly for fuel, and fuelwood is the most important forest product in the Northwest Territories. The quantity of standing timber available for fuel is augmented by the large amount of driftwood which annually finds its way into the Mackenzie River.

The notable development of the mining industry during recent years has created new demands for building material and fuel-wood in the vicinity of the mines. Unfortunately, the increase in prospecting has greatly increased the danger of forest fires.

All forested lands within the Territories are included in four sub-divisions or sections of the Boreal Forest Region. Two of these, the Mixedwood and Northern Coniferous Sections, are represented by relatively small areas adjacent to the boundaries of Alberta and western Saskatchewan. The remainder is included in the Mackenzie Lowlands and Northern Transition Sections.

The Mixedwood Section occupies a small area along the Alberta boundary south of the west end of Great Slave Lake and the Mackenzie River. It is believed to afford the best growing conditions for forest trees in the Territories. Soils are of glacial origin and of considerable depth, and are usually well drained. Aspen and white spruce are the typical trees, and these are accompanied by all the other species found in the region.

The Northern Coniferous Section occupies a small triangle immediately east of Fort Smith with its base on the northern Alberta boundary. Soils are shallow and drainage is poor. Black spruce is the principal tree species, and it is sometimes found in mixture with jack pine, and with tamarack in the lower and wetter areas.

The Mackenzie Lowlands Section is the most important forest area of the Territories. As its name implies, it occupies the low-lying plains in the basin of the Mackenzie River and embraces the lower portions of the Liard, Peel, and Great Bear Rivers. The soil is of glacial, alluvial, and lacustrine origin, and is generally of good depth. Although the sub-soil is never free from frost, trees grow to a fairly good size. White spruce, the poplars, and birch are all well represented; black spruce and tamarack occupy the swamps and jack pine is found in the sandy areas.

The Northern Transition Section lies north and east of a line passing through the mouth of the Mackenzie River to Great Bear and Great Slave Lakes. Unfavourable climatic conditions, together with thin soils and poor drainage, restrict the stunted growth to the most favourable areas in valleys and along the banks of the streams.

Forest Protection

As the fur trade has been and will continue to be the main support of the Indian population, and as forest-dwelling animals supply the Indians with meat, it is felt that one of the greatest values of the forests of the Northwest Territories lies in the habitat which they provide for game and fur-bearing animals.

During the ten-year period ended 1946, serious fires destroyed many valuable forested areas in Mackenzie District which formerly constituted the better type of wildlife sanctuaries. The decline in the fur yield in recent years can be attributed in part to the destruction by fire of the natural cover of fur-bearers. The reduction in the beaver and marten population, which relies upon the forest for protection, has been most marked, and it has been necessary to prohibit the hunting and trapping of these animals by the natives in districts where wildlife formerly was abundant.

Early in 1946, a Forest and Wildlife Service was established to deal with matters relating to the conservation of these natural resources. This organization is headed by a Superintendent of Forest and Wildlife Management resident at Fort Smith. He is assisted by a staff consisting of a mammalogist, a forest engineer, and approximately twenty park wardens. In the Mackenzie River Valley, wardens are occupying well-equipped stations at Yellowknife, Fort Resolution, Fort Simpson, Fort Norman, and Aklavik. These field officers are equipped with boats and modern fire-fighting equipment, enabling them to take prompt action in the case of fires occurring in their

respective districts. At the conclusion of the fire-hazard season, the wardens are employed in making patrols and investigations for the supervision and development of the wildlife resources.

During the summer of 1947, especially designed boats operated by experienced fire-fighting crews were engaged in making patrols of the Mackenzie River, Liard River, and Slave River systems, including Great Slave Lake area, in the interests of forest protection. The Superintendent of Forest and Wildlife Management used a light reconnaissance plane to patrol the inland areas for the purpose of spotting fires. A larger plane was available to transport fire-suppression crews in emergency situations.

Satisfactory estimates of the areas and volumes of the various types in the Territories are lacking, but more definite information becomes available as the area covered by aerial photographs is extended. It is already known that the forests are not of sufficient present value to justify large expenditures in mapping and describing them, but air photographs taken from time to time for other purposes will give the information needed for their administration.

FAUNA

Land Mammals

THE NUMBER OF SPECIES of mammals in the Northwest Territories is not great, but some of those which occur are often present in large numbers. Six species are white for part or all of the year. These are the polar bear, Arctic fox, Arctic (polar) wolf, weasel, Arctic hare, and the collared lemming. A striking feature of animal life in the north is periodicity in numbers. The list of species whose numbers fluctuate from extreme scarcity to great abundance at regular intervals contains most of the smaller mammals, including the Arctic fox, the most important fur-bearing animal in Arctic Canada, and the lynx. In the following paragraphs are listed some of the more prevalent species.

Musk-ox — One of the most interesting mammals is the Barren Ground Musk-ox, *Ovibos moschatus moschatus* (Zimmerman). In fairly recent times, it was found all over the Barren Grounds west of Hudson Bay and on all the Arctic Islands except those of Hudson Bay, Baffin and Bylot Islands, and the Ringnes group. There are now only scattered herds of musk-oxen on the mainland, the largest being in the Thelon Game Sanctuary. There are also herds on certain Arctic Islands, including Melville and Ellesmere Islands. The killing of musk-oxen is forbidden by law.

Caribou — The most important land mammal from the point of view of the natives is the Barren Ground Caribou, *Rangifer arcticus arcticus* (Richardson). It provides them with food and its skin excels all other materials for making clothing and sleeping robes. The largest herds of caribou are found on the mainland, where groups often numbering many thousands are encountered in migrations from one seasonal range to another. The habitat of the Stone Caribou, *Rangifer arcticus stonei* Allen, is west of the lower Mackenzie River. Western Woodland Caribou, *Rangifer caribou sylvestris* (Richardson) is found in small numbers in the wooded districts from northern Manitoba to Anderson River, overlapping slightly the winter range of the Barren Ground Caribou.

Moose, *Alces americana americana* (Clinton), is fairly plentiful in certain sections and ranges north to the limit of trees. The animal is of importance to the Indians for food and clothing.

Mule Deer, *Odocoileus hemionus hemionus* (Rafinesque), is found in the southern portion of Mackenzie District.

Wood Bison, *Bison bison athabascæ* Rhoads, is restricted to Wood Buffalo Park which is partly in Alberta and partly in the Northwest Territories. More than 6,000 Plains Bison were shipped to this area from Buffalo National Park, Alberta, during 1923-27.

Dall's Sheep, *Ovis dalli dalli* (Nelson), nearly pure white, is found in the mountains west of the Mackenzie River.

Columbian Mountain Goat, *Oreamnos americanus columbiæ* Hollister, occurs in the Nahanni region of the Mackenzie Mountains, southwestern Mackenzie District.

Black Bear, *Euarctos americanus americanus* Pallas, is fairly common in the southern part of the wooded region of the Territories.

Grizzly Bear—Several species of the Barren Ground grizzly bear group occur in Mackenzie District. These include Anderson's Grizzly, *Ursus andersoni* Merriam; Richardson's Barren Ground Bear, *Ursus richardsoni* Swainson; and Mackenzie Delta Grizzly, *Ursus internationalis russelli* Merriam.

Polar Bear, *Thalarctos maritimus maritimus* (Phipps), is found about the coasts of the circumpolar regions, and sometimes wanders far out on the ice. It is so much at home in the water that if it were classified according to habits it would be discussed under Sea Mammals, along with the seals on which it feeds. Its numbers vary greatly in different parts of the Canadian Arctic, and in some localities it is common enough to be of real importance to the Eskimos as a source of food and clothing.

Wolf, *Canis lupus* is common throughout northern Canada. Six distinct sub-species have been identified in the Northwest Territories, including the Northern Timber Wolf, *Canis lupus occidentalis* Richardson; Mackenzie Tundra Wolf, *Canis lupus mackenzii* Anderson; and Keewatin Tundra Wolf, *Canis lupus hudsonicus* Goldman.

Coyote—The Northwestern Coyote, *Canis latrans incolatus* Hall, occurs in the Mackenzie District as far north as the Mackenzie delta.

Arctic Fox—The fur industry of the Arctic depends on the Arctic Fox, *Alopex lagopus innuitus* (Merriam). Under this name are included both white and blue fox, which are merely colour phases of the same species. In Arctic Canada, the blue fox is comparatively rare. As has already been mentioned, the number of Arctic Fox, and consequently the catch, varies over a period of about four years. Investigation has revealed that the actual cause of the cycle in fox is a similar cycle in the lemming, on which the fox feeds.

The Lemming is a rodent, resembling a large, chunky field mouse. Two species prevalent in the Canadian Arctic are the Brown or Back's Lemming, *Lemmus trimucronatus trimucronatus* (Richardson), and the Greenland Varying Lemming, *Dicrostonyx grœnlandicus grœnlandicus* (Traill). These creatures can increase in two or three seasons from scarcity to incredible numbers.

Among other fur-bearing mammals which occur in the Territories are the beaver, muskrat, mink, marten, lynx, fisher, weasel, wolverine, skunk, and various phases of the red fox. Hares of various species form an important food supply for natives and for some animals. A number of other mammals, including species of squirrel, mouse, and shrew, are also found.

Sea Mammals

All the sea mammals play an important part in the economy of the inhabitants of the Arctic regions. They are essential parts of the food source of the Eskimos, and from some of them are obtained material for clothing and other articles. Some are also of commercial value to the white traders. The seals, of which there are several varieties, are perhaps of the greatest economic importance to the Eskimos. From them are obtained food, clothing, dog food, and material for implements. The following descriptive notes deal only with the more important species of marine mammals.

The **Arctic Ringed Seal**, *Phoca hispida hispida* Schreber, also called the Rough or Jar Seal, is the common seal of the coasts of both Western and Eastern Arctic regions. It is the chief source of food of some of the Eskimos. The haired skin is used for making waterproof boots, and the dehaired skin for other garments, especially when caribou are scarce. The skins are also purchased by the traders, but do not bring a large price. The young are born in an opening in the snow beside the breathing hole in the ice, and are covered with a white woolly fur.

The **Bearded Seal, Ground Seal or Square-flipper**, *Erignathus barbatus barbatus* (Erxleben), is a circumpolar species which is fairly common in the Eastern Arctic, and also occurs in the Western Arctic, but is not common west of Darnley Bay. It is most plentiful in the vicinity of Dolphin and Union Strait, south of Victoria Island. Owing to its large size (up to 800 pounds) it is much prized by the Eskimos, as it provides a great amount of meat and blubber. Its heavy hide is used for boot soles and for covering the large skin boats, and is cut into heavy line which is used for dog traces, harpoon lines, and lashings of any kind. It lives mostly on crustaceans and mollusks.

The **Atlantic Walrus**, *Odobenus rosmarus* (Linnæus), has become scarce and is now rarely found in the Atlantic Ocean south of Hudson Strait, although at one time it ranged much farther south. In Hudson Bay, it is found as far south as the Belcher Islands. Apparently the western limit of range of the Atlantic Walrus in the south is Fury and Hecla Strait, and in the north the upper part of Prince Regent Inlet as far south as Bellot Strait and the middle of Barrow Strait, south of Cornwallis Island.

The **Pacific Walrus**, *Odobenus divergens* (Illiger), seldom goes east of Point Barrow, although it was formerly plentiful as far as Cape Bathurst. The killing of walrus, except for food, is prohibited, and only Eskimos may kill them without a licence. The export of walrus tusks or ivory, except in the shape of manufactured articles, is legal only by permit from the Minister of Fisheries.

The **Bowhead or Greenland Whale**, *Balaena mysticetus* Linnæus, was at one time very plentiful in Baffin Bay and in Hudson Bay and Hudson Strait. Great numbers of whales were killed during the whaling season, and they soon became so scarce that it was unprofitable to hunt them, especially after the drop in the price of whale-bone and the introduction of mineral oils, which replace whale oil as a lubricant. Before the introduction of firearms, the natives of some localities captured the Bowhead by lancing it from their skin boats; they used the flesh for food, and the oil for food and fuel. The bones were used for making implements.

The **White Whale**, *Delphinapterus leucas* (Pallas), is found in arctic and sub-arctic seas as far north as latitude 74 degrees, and is occasionally found as far south as Cape Cod, Massachusetts. These whales are much prized by the Eskimos, especially when they enter bays and estuaries in large schools.

Narwhal, *Monodon monoceros* Linnæus, found usually in the more northern waters, preferring the proximity of the ice, so that, in summer, its range is more northerly than that of the white whale. These whales are especially abundant at Pond Inlet, and in the icy waters of Foxe Channel and Frozen Strait, and were at one time abundant in Cumberland Sound and along Hudson Strait. Their long, spirally twisted horns, which are overgrown incisors, often attain a length of 8 feet and a weight of 14 pounds.

Birds

Although some systematic work has been done by Canadian Government expeditions, and although early explorers and others have brought back much information of value to ornithologists, relatively little is yet known of the bird life of the Arctic regions. With the establishment of new settlements and posts, however, there should be increased opportunities to make systematic studies of this form of life.

The birds of the Western Arctic and sub-Arctic region of Canada are somewhat different from those of the Eastern Arctic, owing to the existence of wooded areas in the former region. In the lower part of the Mackenzie River basin, bird fauna is essentially Eastern as far as the Arctic Coast at 138 degrees west longitude. As the valley is sheltered, it carries the range of many species far north of their limits farther east. The robin, yellow warbler, and water-thrush are found as far north as the lower islands of the Mackenzie delta, while western influences may be seen in the delta in species like the varied thrush and Say's phœbe. Other typical birds of the wooded area include the white-crowned sparrow, Canada jay, and spruce grouse. The unwooded area has such Arctic species as the willow and rock ptarmigan, snow bunting, and lapland longspur. On the border between woods and tundra, the tree sparrow and Harris's sparrow find their nesting ground.

Geese and fresh-water ducks breed in the marshes and lakes, particularly in the Mackenzie Valley, and are of some importance as food for the residents. They also contribute migratory fowl for the south. The game ducks breed mostly in the delta and in the overflow flats along the Athabaska-Slave-Mackenzie Rivers system. The lakes of the Precambrian area are as a rule deep and clear, and, as they provide little feed for ducks, few breed there to augment the southern flights for autumn. The only common duck in the tundra region is the old squaw, which breeds in the interior north of the timber-line. Many Canada geese and lesser snow geese breed east of the Mackenzie delta, on Banks Island, and farther east. The white-fronted goose is of general distribution, but is not common anywhere along the coast. Whistling swans are fairly common east of the Mackenzie River, especially in the region near Langton Bay. Black brant breed near the coast east of the Mackenzie in the vicinity of Cape Bathurst. Farther east, the black brant is replaced by the common or white-breasted brant. Blue geese nest only in the Canadian Arctic, and their principal nesting ground, which was discovered in 1929, is on the west coast of Baffin Island. Two other nesting areas have been discovered, one on Southampton Island and the other on the Perry River. Ross's goose is known to nest on the Perry River, which drains into Queen Maud Gulf. Snow geese nest widely on the Arctic tundra, the larger sub-species, the greater snow goose, nesting on northern Baffin Island and to the westward.

Compared with those of the Eastern Arctic, the coasts of the Western Arctic are generally low and flat, and they provide a more favourable area for shorebirds and tundra plain species. The absence of puffins, auks, and auklets in the Western Arctic, and in fact, east of Point Barrow, is due

mainly to the physical character of the coasts. These birds are abundant in western Alaska as far as Cape Lisburne, where the rocky cliffs preferred by the birds as nesting places terminate, and the coastal plains appear.

Most of the migrants on the main Arctic Coast move from east to west instead of north and south. The sea-ducks, gulls, jægers, and many of the shore birds come from the Bering Sea and the Pacific Ocean. Some of them come around the far northwest corner of Alaska, reaching the eastern limit of their range as far east as Banks Island, Melville Island, and Coronation Gulf. East of Franklin Bay, the country for the most part is barren or rocky, and the shores of Amundsen Gulf, Dolphin and Union Strait, and a large part of Coronation Gulf show a surprising scarcity of birds. The migrations follow regular narrow and uniform routes from year to year. In the early spring, they follow leads of open water along the edge of the floe-ice, but later they follow the coast from one headland to another straight across the ice of the bays. At Cape Bathurst and at Baillie Island post on the peninsula between Liverpool and Franklin Bays, there may be seen during some seasons an almost continuous migration of eiders, starting before the season of open water and lasting until the autumn freeze-up.

The willow ptarmigan and the smaller rock ptarmigan are the most important birds in the economy of the northland. They are widely distributed, reaching the most northerly islands, and are prolific breeders. They form an important part of the food of the fur-bearing carnivores, and provide the only feathered game available for human food in an emergency. Except for minor fluctuations, the ptarmigan will probably maintain their numbers for many years, as vast areas are still unhunted.

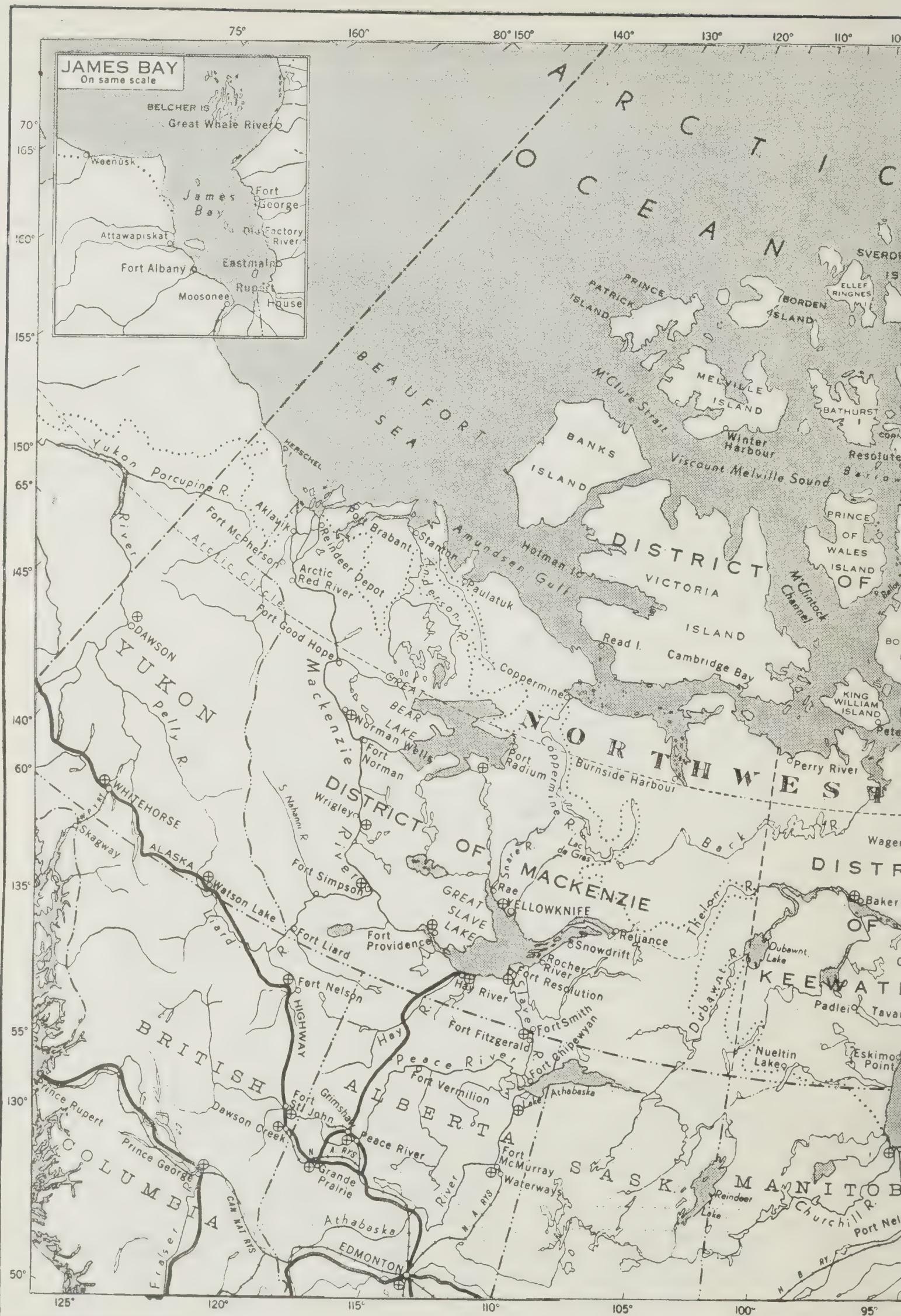
Fish

Fish of several varieties are abundant in many parts of the Northwest Territories and are of economic importance. For the most part, however, it has not been considered commercially feasible to export them, owing to the distances from the fish consuming centres. Because of peculiar water conditions and of a deficiency of fish food, the main portion of Hudson Bay is not productive of fish, and it is questionable whether, over a period of several years, its coastal rivers and shore fisheries can do much more than support the needs of the local population.

The scarcity of fish in Hudson Bay was noticed as far back as 1771, when the Hudson's Bay Company investigated the bay's resources. In 1931, the Department of Fisheries made a study of the deep sea fisheries of the bay, using steam trawlers and drag nets, but after three weeks of effort, during which more than 200 miles of sea bottom were covered, no commercial fish were taken. During the same season, the Department investigated the coastal fisheries north of Churchill. Competent fishermen, using nets, covered the area, but obtained only about 6,000 pounds of fish during the summer and autumn seasons, the chief varieties taken being Arctic char and ciscoes.

Following are descriptive notes on the chief varieties of fish found in the Northwest Territories and in waters bordering the Territories.

Arctic Char, also called sea trout or salmon, is perhaps the most important food fish of the Arctic. This species occurs in great numbers in certain seasons of the year and is found in both fresh and salt water, chiefly near the mouths of rivers in the latter case. These fishes are plentiful in parts of the Eastern Arctic, principally the Baffin Island area, the rivers of Melville Peninsula, and the northern parts of Hudson Bay. They also frequent the coastal waters of the northwestern mainland of the Northwest Territories.



A detailed map of the northern coast of Ellesmere Island, Canada. The map shows the coastline from approximately 90°W to 40°W. Key features labeled include the Bache Peninsula, Thule, Craig Harbour, Sd., Eureka, Eiberg Island, and Axel Island. The map also includes labels for 'ELLESmere' and 'ISLAND'. The background shows the Arctic Ocean with various icebergs and landmasses.

CANADA
DEPARTMENT OF MINES AND RESOURCES
LANDS AND DEVELOPMENT SERVICES BRANCH
THE
NORTHWEST TERRITORIES

SCALE OF MILES

A horizontal scale bar divided into four segments by vertical tick marks. The first segment is labeled "100" at its left end. The second segment is labeled "50" at its left end. The third segment is labeled "0" at its left end. The fourth segment is labeled "100" at its right end. The fifth segment is labeled "200" at its right end.

REFERENCE

Highways
Railways
Airports or Landing Fields⊕
Northern Limit of Wooded Areas

Detailed description: This is a historical map of the Canadian Arctic and Subarctic. It features a large area of Baffin Bay with labels like Dundas Harbour, Bylot Island, and Pond Inlet. To the west is the Franklin Islands group. The Northwest Territories are shown with labels such as Foxe Basin, Melville Pen., Foxe Channel, Cape Dorset, and Southampton Island. Hudson Bay is prominent with labels like Port Harrison, Richmond Gulf, Belcher Is., and Great Whale River. The Labrador coast is on the right with labels like Rigolet, Cartwright, Northwest River, and Goose Bay. Various settlements are marked with crosses. Latitude lines from 35° to 65° are shown on the right, and a dashed line indicates the Arctic Circle. A large diagonal label 'GREENLAND' runs across the top right. The map is drawn at the Hydrographic and Map Service, Ottawa, in 1948.

DRAWN AT THE HYDROGRAPHIC AND MAP SERVICE, OTTAWA, 1948.

Whitefish of one or more species is found in almost every lake or stream of the mainland. Many of the early explorers depended on it to a large extent for food and it still plays an important part in the food economy of sparsely settled regions. It makes an excellent dog food for winter travel.

Round Fish, Frost Fish, is a species of whitefish of which little is known as to abundance or distribution in the Territories.

Arctic Cod is widely distributed in Hudson Bay and among some of the islands of the District of Franklin.

Ordinary or Newfoundland Cod has been taken at Port Burwell at the entrance to Hudson Strait. Cod weighing up to 40 pounds are taken in the tidal lagoons in Frobisher Bay.

Tom Cod is found in Western Arctic waters as far east as Coronation Gulf and is abundant in some localities. These cod are taken through the ice with hooks and are also caught by the Copper Eskimos with a large barbless hook holding small bone bangles. Other members of the cod family are occasionally caught in the Eastern Arctic.

Halibut or Greenland Halibut is found in the Eastern Arctic, especially on the Greenland side.

Flounder, a Pacific species, is found east of Coronation Gulf.

Inconnu or Conny inhabits most of the large rivers of the Northwest Territories west of Anderson River, ascending them as far as the first rapids. These fishes are of low vitality and are sluggish, which probably explains why they are not found above any heavy rapids in the streams they frequent. They average from 8 to 20 pounds. In the Mackenzie River system, the inconnu probably winter at the Mackenzie delta and in Great Slave Lake. They ascend the rivers about June and return in October. They spawn at Fort Smith from about mid-September to October and are found in great numbers in the eddies below the rapids. At the mouth of the Mackenzie River, they are caught by the Eskimos through the ice by means of hook and line baited with an ivory lure. The larger Connies are not palatable but the smaller ones, when dried and smoked, are suitable for human consumption. Connies make excellent dog food.

Grayling, or Bluefish as it is called in the Mackenzie region, is widely distributed but is found only in clear lakes and rivers. It is of little value as food or game fish.

Suckers are found in most of the waters of the Mackenzie delta and in the rivers of the Mackenzie Valley. They are used for dog food when other fish are not obtainable.

Cisco, Tullibee, Lake Herring is found in the brackish portions of Hudson and James Bays and also along the Arctic Coast and in the Arctic Red River, where it is abundant in the spawning season in September. Several species occur in the mainland portions of the Northwest Territories.

Great Bear Lake Herring is a common food fish in the Western Arctic along the coast as far as east of Coronation Gulf. It is caught in nets during the summer and by hooks during the ice season.

California Herring is abundant in the waters about Cape Bathurst in late August, where it is taken in nets in large numbers.

Lake Trout is a very excellent food fish and is found in most of the large inland lakes in Mackenzie and Franklin Districts, especially in deep waters. These trout occasionally reach a weight of 60 pounds.

Pike or Jackfish is found along the north mainland coast from Alaska to Cape Bathurst in the rivers and inland lakes and is especially abundant in the region of the Mackenzie delta. Pike weigh as much as 35 pounds, but average from 5 to 15 pounds. They frequent clear pools at the foot of falls and rapids and the deeper lakes.

Smelt is common about the Arctic Red River and is an important food in that locality.

Burbot, Ling, Loche is found in most of the fresh and brackish waters of Mackenzie and Keewatin Districts, but is not abundant. It also occurs along the coasts of James Bay.

Other fish of lesser importance found in the waters of the Northwest Territories include goldeye, several members of the sculpin family, several varieties of ray, dog fish in Davis Strait, stickleback, and the Greenland or sleeping shark.

GEOLOGY*

THE NORTHWEST TERRITORIES are made up of parts of four of the six physiographic divisions of Canada. The islands to the north form the Arctic Archipelago. On the west, the Mackenzie Mountains are the northeastern extension of the Great Cordilleran region which makes up most of British Columbia and Yukon Territory. The belt bordering the Mackenzie River is the northern extension of the Interior Plains of Central Canada. East of this belt and extending over to Hudson Bay is a great area that forms part of the Canadian Precambrian Shield.

Canadian Shield

The Canadian Shield portion of the Territories is a region of comparatively low relief, rising gradually from the Arctic Ocean on the north and from Hudson Bay on the east to elevations of about 1,500 feet in its central part east of Great Bear and Great Slave Lakes. The area is hummocky, consisting of ridges and hills separated by depressions occupied by lakes or muskegs. The many lakes are of all sizes and shapes, and have irregular shorelines and many islands. For most of the area the local relief is rarely more than 100 feet, but in places east of Great Bear Lake it is more than 1,000 feet.

The low relief of the region is the result of long continued erosion in late Precambrian time, which levelled the mountain belts that must have existed in earlier times. During the Palaeozoic and Mesozoic eras this region of low relief was probably partly covered by seas that advanced over its surface and later retreated. The sediments that accumulated in these seas were largely swept away by later erosion when, during the Tertiary period, the region stood above the sea.

The oldest known rocks in the Northwest Territories are Archæan (early Precambrian) volcanic flows and sediments. The volcanic rocks, which in general are older than the more widespread sedimentary rocks, are mainly altered basic lava flows or greenstones, locally altered to chlorite or hornblende schists. The sedimentary rocks for the most part are well bedded greywackes and slates that have been altered over large areas to knotted quartz-mica schist and hornfels by the intrusion of large granite batholiths. Both the volcanic and sedimentary rocks have undergone

* Prepared by A. W. Jolliffe and revised by J. F. Henderson, Geological Survey of Canada, Mines, Forests, and Scientific Services Branch, Department of Mines and Resources, Ottawa.

several periods of folding and faulting and are now steeply inclined or overturned. These Early Precambrian rocks have been called the Yellowknife group and the Point Lake-Wilson Island group north of Great Slave Lake, and the Tazin series south of this lake.

During Proterozoic or later Precambrian time, there were at least two periods during which great thicknesses of sedimentary and volcanic rocks accumulated in several widely separated areas. Rocks of the older period have been recognized on the north shore of Lake Athabaska, in the east arm of Great Slave Lake, near the Arctic Coast, and in several intervening areas. On the north shore of Lake Athabaska, white and red quartzite of the Beaverlodge series overlies Archæan sediments of the Tazin series and granitic rocks, but is itself cut by granite, gabbro, and norite. Between Athabaska and Great Slave Lakes, the Nonacho series of conglomerate, slate, greywacke, arkose, and quartzite occupies an area about 100 miles long and up to 25 miles wide. The area is completely enclosed by granitic rocks, in part older, in part younger, than the Nonacho sediments. Along the east arm of Great Slave Lake, a synclinorium about 150 miles long consists of conglomerate, arkose, sandstones, quartzite, shale, slate, oolitic iron formation, dolomite, breccia, basalt, andesite, trachyte, rhyolite, porphyry, and tuff. Two or more series of strata may be represented in this assemblage, which is known as the Great Slave group. It rests unconformably on granite, and is itself intruded by syenite and diorite.

Between Great Slave and Great Bear Lakes, several areas are underlain by quartzite, arkose, conglomerate, slate, argillite, greywacke, dolomite, and limestone, with minor flows and basic intrusions. These rocks, which resemble the lower part of the Great Slave group, have been called the Snare group. Pre-Snare and post-Snare granitic rocks occur in the vicinity. Along the east coast of Great Bear Lake and to the east is the Echo Bay group of sediments, bedded tuffs, lavas, and intrusive and extrusive porphyries. These rocks are overlain by the Cameron Bay group comprising conglomerate and red sandstone. Along the Arctic Coast, between Parry Peninsula and Bathurst Inlet, three formations of probable early Proterozoic age rest on Archæan granite. They include the Epworth dolomite, the Kanuyak calcareous tuff and tuff-conglomerate, and the Goulburn quartzite.

Late Proterozoic time was marked by the accumulation of flows and clastic sediments over large areas. These include the Coppermine River series of the Arctic region, the Et-then series of the Great Slave Lake region, and the Athabaska series of the Athabaska-Dubawnt Rivers region. The Coppermine River series consists largely of basaltic flows interbanded with some sandstone and shale and cut by diabase sills; the Et-then series of conglomerate, sandstone, and quartzite resting unconformably on members of the Great Slave group; and the Athabaska series of white, buff, and reddish sandstone, arkose, and conglomerate.

The last great event in the geological history of the region was the spread of a continental ice mass in Pleistocene times. This had its gathering ground west of Hudson Bay, from which centre it advanced in all directions. Erratics and morainal material left by the ice are scattered over the entire region.

Continuous mining operations commenced in the Shield part of the Northwest Territories in 1933. Pitchblende from the Great Bear Lake area and gold from the Yellowknife district are the main minerals produced. Data on pitchblende production are not available but the annual gold production in 1942 reached \$3,826,000. Due to the war and consequent labour shortage, gold production fell to \$333,218 in 1945. It was increasing

rapidly in 1947, however, and should exceed its former peak within a few years. Other minerals recovered in small quantities, mainly as by-products, include silver, copper, and lead. A small amount of tungsten was produced during the war. The more important known occurrences of minerals of possible economic interest are summarized below.

Gold occurrences are widespread in the region extending northwestwards for 200 miles from the east arm of Great Slave Lake. They are also known along and near the west coast of Hudson Bay — on Chesterfield Inlet, Wager Bay, Term Point, and the Ferguson River. Radium and silver minerals are found at a number of places east of Great Bear Lake and to the south along the Camsell and Marian Rivers. Copper occurrences are common around Coronation Gulf and south to Great Bear Lake. A copper-nickel sulphide body containing platinum group metals occurs on Rankin Inlet on the west side of Hudson Bay. Cobalt and nickel are associated with the Great Bear Lake ores and are also found in the area adjacent to the east arm of Great Slave Lake. Low-grade iron ores are found on islands in Great Slave Lake. Lead minerals occur on the Arctic Coast, and in the Taltson River and Pine Point areas south of Great Slave Lake. Lead-zinc copper replacement bodies are found in the Yellowknife-Beaulieu region near Homer and Tumpline Lakes. Chromite has been reported from Melville Peninsula and from the Coppermine River area. Molybdenite occurs in the Yellowknife district. Tungsten has been recovered from the gold ores on Outpost Islands, Great Slave Lake, as well as from one of the hundreds of scheelite deposits in the Yellowknife-Beaulieu region. Tin-bearing minerals have likewise been found in both of these districts. Tantalum, beryllium, and lithium minerals occur in pegmatites in the Yellowknife-Beaulieu region. Fluorite is reported from Baker Lake and from Snare River. Semi-precious gems, including sapphire, dichroite, chiastolite, jade, and lazulite have been found along and near the western margin of the Shield.

Cordilleran Region

An area of some 30,000 square miles of the Northwest Territories, west of the Mackenzie River and between the Peel River on the north and the Liard River on the south, is part of the great Cordilleran region of Western Canada. The Mackenzie Mountains, forming this region and a part of Yukon Territory, are made up of ranges trending in a northwest direction and ranging in elevation up to over 8,000 feet with a relief, where explored, of 3,000 to 4,500 feet. The drainage of the area is to the Mackenzie, the chief streams being the Arctic Red River, the Carcajou, the Keele (formerly the Gravel), the Root, the North Nahanni, and the South Nahanni, the last of which empties into the Liard. These streams have steep gradients. On the Keele River, where the belt is widest, the high mountains lie about 50 miles from the Mackenzie River, and between them and the Mackenzie lowland is a zone of foot-hills about 3,000 feet in height. Farther south at the "Great Bend" of the Mackenzie near where the latter is joined by the North Nahanni, the mountain front is an abrupt escarpment whose top is 2,000 to 3,000 feet above the valley plain.

The rocks of the range are chiefly sediments of Palaeozoic age ranging from Upper Cambrian to Carboniferous. The rocks of the eastern belt are heavily bedded limestones, dolomites, sandstones, and conglomerates. Nahanni Peak, one of the striking mountain features to be seen by the traveller descending the Mackenzie River, is composed of Middle Devonian strata. Lying above the hard limestones are Upper Devonian shales which have a thickness of as much as 2,000 feet, and above these is a limestone zone 800 to 1,100 feet thick. This in turn is succeeded by other shale and

limestone facies from 1,300 to 1,500 feet thick, all of Upper Devonian age. On the North Nahanni, the Middle Devonian rocks form an anticline, with steep dips on the east and more gently inclined beds on the west.

In Pleistocene times, the Mackenzie Mountains were occupied by the northern extension of the Cordilleran ice-sheet which here had a thickness of about 3,000 feet. The higher peaks were not covered.

Not many mineral occurrences have been reported from the Cordilleran part of the Northwest Territories, due in part, at least, to the fact that only very limited exploration and prospecting have been carried on. Iceland spar has been recovered from deposits in the northern part of the mountains; low-grade iron ores are exposed along the Keele (Gravel) River; and placer gold has been found along the Peel, Nahanni, and Liard Rivers.

The Interior Plains

The Mackenzie lowland includes the belt between the Cordilleran region on the west and the Canadian Shield on the east. It begins on the Slave River, embraces the basin at the west end of Great Slave Lake, and continues down to the Arctic Coast. On the Slave River its elevation is about 700 feet, and from there northward the surface slopes gradually to the Arctic Ocean. North of the North Nahanni River, the lowland is divided by the long, narrow ridge of the Franklin Mountains, and consists of a western part varying in width from 20 to 80 miles through which the Mackenzie River flows, and an eastern part occupying all but the east side of the drainage basin of Great Bear Lake. The highest summit is Mount Clark of the Franklin Range, which has an elevation between 3,000 and 4,000 feet.

The Mount Clark formation consists of red quartzites and sandstones of probable lower Cambrian age. Above these lies the Middle Cambrian Mount Cap formation of grey, green, and red sandstones and shales. These in turn are overlain by a series of red and green shales with gypsum and salt bearing beds of uncertain age lying between Middle Cambrian and Upper Silurian beds. Shale beds of possible Ordovician age are exposed at the base of Mount Kindle east of Wrigley.

Rocks of Ordovician and Silurian age form the base of the Palaeozoic section along a considerable part of the eastern edge of the lowland belt, where the Palaeozoic sediments overlap the precambrian rocks of the Canadian Shield. On the west side of the north arm of Great Slave Lake, Ordovician sediments form an escarpment which probably continues northward to Great Bear Lake. Silurian limestone and gypsiferous dolomite occur along the Slave River, and silurian strata are also exposed on Lone Mountain near the mouth of the North Nahanni River, in Bear Mountain near Norman, and on Mount St. Charles on the Great Bear River.

The Silurian strata are succeeded unconformably by beds of Devonian age which form the surface rocks over the greater part of the Mackenzie Lowland region. On Great Slave Lake, the Devonian strata have been divided into three formations, in ascending order: the Pine Point limestone, about 100 feet thick; the Presqu'ile dolomite, with an estimated thickness of 200 feet; and the Slave Point limestone, about 160 feet thick. Along the lower Mackenzie, the following formations have been correlated with these respectively; the Hare Indian River shales, over 300 feet thick; The Ramparts limestone, 250 feet thick; and the Beavertail limestone, 350 feet thick. The Ramparts limestone is so named from its excellent exposures in The Ramparts section just above Fort Good Hope.

Sandstones and shales of Cretaceous age cover considerable areas in the Mackenzie Lowland region. They outcrop on the Liard River near the southern border of the Territories, along the Mackenzie north of the Dahadinni River in several disconnected stretches, and along the western shores of Great Bear Lake. The beds are largely of marine origin, but in places some of the lower strata carry coal seams. At the mouth of the Bear River, a basin of partly consolidated Tertiary sands and clay with lignite beds has a length of 30 to 40 miles and a width of from 20 to 30 miles. The beds are of lacustrine origin.

The mineral resources of the Interior Plains include salt, gypsum, the mineral fuels, lead, zinc, and iron. Petroleum valued at nearly one million dollars was produced at Norman Wells between 1932 and 1943, inclusive, and in 1944, under the Canol Project, this field had a peak production of 1,229,310 barrels. Oil seepages have been reported from numerous other places in the Mackenzie River Valley. Lignitic coal occurs near Fort Norman and Aklavik, and on the east coast of Great Bear Lake. Salt and gypsum deposits are widespread throughout the Interior Plains: some deposits have been put to local use. Ferruginous beds outcrop in the Franklin Mountains. Lead and zinc minerals are found in Devonian limestones near Pine Point on the south shore of Great Slave Lake.

Comparatively little is known of the geology of the Arctic Archipelago. Available information suggests that, like the mainland part of the Northwest Territories, a three-fold division into Shield, Plains, and Mountains is warranted. Thus, the southeastern islands are composed chiefly of crystalline rocks of Precambrian age. Northwesterly, these become overlain by nearly flat Palaeozoic sandstones and limestones, with successively younger strata, including carboniferous coal seams, generally similar in age and structure to the rocks of the Interior Plains, appearing at the surface. In the extreme northwestern part of the Archipelago, observations at a few widely separated districts suggest the existence of a mountain range, consisting largely of folded and intruded Mesozoic rocks extending southwesterly for nearly a thousand miles from northern Ellesmere Island through the Sverdrup group.

Occurrences of graphite and mica near the southeast coast of Baffin Island have been known for more than 360 years; some mining has been done for both these minerals. Coal has long been mined for local use from a small basin of Tertiary rocks near Pond Inlet on Baffin Island. One hundred miles to the west, platinum, nickel, and silver occurrences have been reported from Admiralty Inlet. Iron ores are found in rocks of Proterozoic age on Belcher and Nastapoka Islands in Hudson Bay; at the latter locality they contain appreciable amounts of manganese.

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THE MINING INDUSTRY

THE PRODUCTION of minerals on a commercial basis in the Northwest Territories is a comparatively recent development, and the value of the annual output is not large when compared with that of older mineral-producing areas of the Dominion. Mining has, however, surpassed in value the fur trade, the only other important industry in the Territories, and, up to the end of 1942, showed a steady increase. Conditions brought about by the war contributed to a decline during the following three years, but, by 1946, mineral production was increasing. Since then a steady improvement, particularly in the Yellowknife gold-field, has been evident.

The occurrence of potentially valuable minerals in the Northwest Territories was first reported by Martin Frobisher, who in 1576 entered a bay in southern Baffin Island which now bears his name. Copper was found by Samuel Hearne near the mouth of the Coppermine River in 1771, and, in 1789, Alexander Mackenzie observed coal seams on the river named for him, but most of the present knowledge of the mineral possibilities of the region has been acquired since 1920. During that year and the four years following, oil in commercial quantities was obtained from wells drilled about 48 miles north of Fort Norman on the Mackenzie River. However, as there was no market for the oil, the wells remained capped for several years.

Interest in the mineral possibilities of the Northwest Territories has resulted mainly from the discovery of radium-bearing and silver ores on the eastern side of Great Bear Lake in 1929 and 1930. The spectacular nature of the discovery—destined to effect a marked reduction in the price of radium—inspired a world wide interest in the region. This interest was intensified by the discovery of gold in the vicinity of the Yellowknife River on the north shore of Great Slave Lake in 1933-34, resulting in the development of a field whose potentialities have not yet been fully determined.

Petroleum

Seepages of petroleum in Mackenzie District were known to early explorers, and the first report of the Geological Survey of Canada on the Mackenzie River region, covering field-work undertaken in 1887-88, noted indications of the presence of petroleum. In 1914, three petroleum claims were staked along the Mackenzie River near Bosworth Creek, about 48 miles north of Fort Norman. These claims later were acquired by the Northwest Company, a subsidiary of Imperial Oil Limited, and, in 1919, drilling equipment was shipped to the site, now known as Norman Wells. In 1920, the first well was drilled and oil in commercial quantity encountered. Three "wildcat" wells drilled by the Northwest Company and one by the Fort Norman Oil Company between 1921 and 1924, within a 45-mile radius of Discovery Well No. 1, failed to produce oil in commercial quantity, but another producer was brought in by the Northwest Company near Discovery Well in 1925.

A small still, capable of producing gasoline and diesel fuel, was installed by the Northwest Company in 1921, but there was little demand for these products until the mining of pitchblende was commenced at Great Bear Lake in 1933. The development of gold mines in the Yellowknife area greatly increased the demand for petroleum products, and Imperial Oil Limited drilled and brought in two more wells in 1939 and 1940. The productive capacity of the four wells was then about 450 barrels of oil daily. A small refinery erected in 1939 came into operation in 1940, and its products now include aviation and motor gasolines, light and heavy diesel oils, and fuel oil. In 1943, the capacity of the refinery was increased from 840 to 1,100 barrels of crude petroleum per day.

Following the outbreak of war between the United States and Japan, the petroleum industry at Norman Wells underwent a tremendous expansion. The demand for an increased supply of petroleum products for the use of the United States Army in Alaska prompted Canada and the United States to enter an agreement whereby the latter would undertake a development known as the "Canol Project." Under the terms of the agreement, the project involved an extensive drilling program to determine the extent and capacity of the oil producing area in the vicinity of Norman Wells; construction of a pipeline, with a capacity of 3,000 barrels daily, from Norman Wells to Whitehorse, Yukon Territory; and the erection of a refinery at Whitehorse.

Imperial Oil Limited, which, as the Northwest Company, had been pioneering the district since 1919, was appointed agent for the United States Government and awarded a contract for drilling and geological exploration. Drilling was commenced in 1942 and continued through 1943 and 1944 into 1945. Construction and testing of the pipeline were completed by the end of March, 1944, and the refinery at Whitehorse was opened in April of the same year. Deliveries of oil by pipeline to the refinery eventually reached a maximum of 4,000 barrels daily. Drilling operations were terminated on March 8, 1945, by order of the United States Government. The pipeline and the refinery at Whitehorse ceased operations about April 1, 1945, and the contract with Imperial Oil Limited was officially terminated in May, 1945.

During the period 1942-45 in which the Canol Project operated, 67 new wells were drilled, of which 60 found oil in commercial quantity. These wells outlined a field of more than 4,000 acres in extent, with an estimated recoverable reserve of 36,250,000 barrels of petroleum. Prior to 1942, the production of the field totalled 118,895 barrels. Production during the life of the Canol Project was 1,858,447 barrels. The total production of the Norman Wells field to December 31, 1947, was 2,463,780 barrels. Of this quantity, 231,844 barrels were obtained in 1947.

The Canol Project was a military enterprise undertaken for North Pacific defence. When its objectives had been achieved, economic considerations forced its abandonment. The closing down of the pipeline shut off the principal market for crude petroleum output of the Norman Wells field, and many of the wells have since been capped or plugged. The remainder will more than meet the petroleum requirements of the Mackenzie District for many years to come. The greater part of the crude oil now processed at Norman Wells is shipped for consumption at the Eldorado Mine on Great Bear Lake and for use in the vicinity of Yellowknife. The demand for oil products in the latter area is increasing, and deliveries in 1947 reached a new high.

Petroleum exploration has been undertaken in areas other than Norman Wells, but results have been disappointing to date. During 1945 and 1946, exploratory wells were drilled on Redstone River, a tributary of the Mackenzie River, about 125 miles south of Norman Wells, and on the Mountain River approximately 75 miles north of Norman Wells, but failed to produce oil. Extensive exploratory drilling and prospecting for petroleum were also undertaken on the Hay River, near the western end of great Slave Lake, in 1946 and 1947, with the object of defining the Hay River anticline.

In 1948, a syndicate was formed to search for petroleum near Providence.

Radium and Uranium

During a geological survey of the Great Bear Lake region in 1900, J.A. Mackintosh-Bell, of the Geological Survey of Canada, and Charles Camsell, later Deputy Minister of Mines and Resources, observed that the rocks

facing the eastern shores of MacTavish Arm were stained with "cobalt bloom and copper-green." Travelling under pressure just before freeze-up, the party did not investigate the geology in detail. Not until thirty years later were the mineral possibilities of Great Bear Lake established.

In 1929, several parties started prospecting in the vicinity of Hunter Bay and the Sloan River. One of those who explored the district was Gilbert LaBine, a prospector trained in the Cobalt area of Ontario. On his return flight from the area that autumn, LaBine noted evidences of silver and copper on a small island in the vicinity of Echo Bay, 30 miles south of Hunter Bay. The following spring, LaBine returned to the area with his partner, E.C. St. Paul. In May, 1930, they made the great discovery of pitchblende on what is now known as LaBine Point, at the mouth of Echo Bay.

Claims were staked, trenching and test-pitting were undertaken, and samples were brought to Ottawa, where officers of the Department of Mines confirmed them as high-quality pitchblende, the ore of radium and uranium. Plans for the commercial development of the deposits were subsequently made, and a suitable process for the extraction of radium from the Great Bear Lake ore was eventually worked out with the assistance of metallurgists of the Department of Mines at Ottawa.

During 1933, Eldorado Gold Mines, Limited, as the company was then called, completed the erection of a milling plant on the property at LaBine Point, Great Bear Lake. A refinery was also constructed at Port Hope, Ontario. In May, 1933, the first gram of radium was produced at the refinery, and by the end of that year the company was in steady production. Within a short time, Canada had become one of the two important producers of radium in the world. The result was a decline in the price of this substance from \$70,000 to \$25,000 a gram. To meet the problems of transportation, the company gradually developed a system involving the use of power boats, barges, and oil tankers, now known as Northern Transportation Company Limited.

The production of radium in Canada was well-established by September 1939, when World War II commenced, but in June, 1940, the Eldorado company was forced to close down its mine owing to disorganized world markets. At the time operations were suspended, the Eldorado mine, together with one in the Belgian Congo of Africa, produced virtually the entire world supply of radium. Few realized that the ore from this mine could be the source of material that would have effects more far-reaching than all the radium it had produced. The splitting of the uranium atom was accomplished in 1939, and was subsequently investigated on a wide scale. When the tremendous possibilities of fission were sensed, particularly in application to military operations, the urgency of safe-guarding supplies of uranium available to the United Nations became urgent. In the spring of 1942, the Eldorado mine was reopened with a minimum of publicity, and, after dewatering, was brought back to normal production.

Early in 1944, the shares of the company were expropriated by the Dominion Government. The properties are now operated by a crown Company known as Eldorado Mining and Refining (1944) Limited. During 1944, extensions to the plant buildings were made, and the shaft was enlarged to three-compartment size and deepened to provide additional levels. The concentrates produced at Great Bear Lake are shipped by plane and by other means to the refinery at Port Hope for reduction to radium, uranium salts, and other products. Information relating to the tonnage of ore mined, milled, and shipped has been treated as confidential since 1941. Since the reopening of the mine in 1942, extraction processes at the refinery have been

improved. The Eldorado company is now one of the two foremost producers of uranium in the world, and, while radium has become a by-product, it is nevertheless extremely valuable.

Concurrent with the development program at the Eldorado Mine has been a broad program of prospecting and geophysical surveys carried on in the surrounding territory by a subsidiary of the Crown Company, and by the Geological Survey of Canada. In 1944, activity was also resumed at the property of International Uranium Company Limited, on Contact Lake, southeast of Eldorado mine, where a pitchblende-silver property had been brought to milling stage by Bear Exploration and Radium Limited prior to cessation of operations in 1938. In 1947, more than ten tons of high grade silver ore were shipped, following dewatering of the shaft, reconstruction of the mill which was damaged by fire in 1946, and installation of power plant equipment. Exploratory drilling has also been undertaken on the properties of Gold Uranium Exploration Limited at Hottah and Hardisty Lakes, and a resumption of activity is expected on the claims of the Camsell River Silver Mines, Limited, at the mouth of the Camsell River.

Gold and Other Minerals

Prospecting for gold in the Territories was first undertaken in 1896-97 by miners on their way to the Yukon "Klondike" along the Mackenzie River or "back-door" route. These miners discovered placer gold and lead in the Mackenzie Mountains, lead-zinc deposits near Pine Point on Great Slave Lake, and gold at Yellowknife Bay, but no general mining activity resulted. The discoveries at Great Bear Lake in 1930, however, re-focused attention on the region, and interest was intensified when gold-bearing ore was found in the Yellowknife River area in 1933 and 1934. By 1935, a major rush had developed, and staking had extended north and east of Yellowknife Bay for many miles. Prospecting of claims followed, and several properties were developed into producing mines.

In September, 1938, the first gold brick produced in the Northwest Territories was poured at the Con Mine of Consolidated Mining and Smelting Company of Canada, Limited, situated west of Yellowknife Bay. Other properties in the vicinity which later came into production were the Rycon mine operated by the Consolidated Mining and Smelting Company, Limited, and that of Negus Mines Limited, in 1939; Slave Lake Gold Mines Limited, (now Philmore Yellowknife Gold Mines, Limited) on Outpost Island, and Thompson-Lundmark Gold Mines Limited at Thompson Lake in 1941; and Ptarmigan Mines Limited, near Prosperous Lake, early in 1942. In addition, a shaft was sunk at the Camlaren property at Gordon Lake, and a small mill installed at the Ruth mine of Consolidated in the François Lake area. Some high-grade ore was also shipped by Giant Yellowknife Gold Mines, Limited, from its property on the west shore of Yellowknife Bay, before operations were suspended in June, 1940.

From 1938 to 1942, mineral production in the Yellowknife district increased progressively, reaching a peak in 1942, when gold to the value of \$3,826,000 was mined. Of this amount, nearly half came from the adjoining Con and Rycon mines. Silver production, a by-product of gold-mining operations, was \$9,500 for the same year. Late in 1942, an increasing shortage of labour and supplies, resulting from war conditions, forced some mining companies to suspend operations temporarily. A general recession in mining activity followed, and, by the end of 1943, all mines with the exception of Negus had either closed down or ceased production. The mill of Negus Mines Limited was closed in September, 1944, but maintenance work and the development of ore reserves were continued at both Con and Negus properties.

Although gold production in the Yellowknife district was suspended in 1944, new developments that year led to greatly increased activity. Control of the Giant Yellowknife property passed to new interests, and a broad diamond drilling program, carried on in 1944 and 1945 after detailed geological examination, disclosed extensive zones of high-grade ore. The ore bodies lie in shear zones traced across the greater length of the property for a distance of more than two miles. These discoveries precipitated an unprecedented rush, and led to intensive prospecting of the entire region. By 1945, approximately 200 mining companies and syndicates owned mineral claims in the district or had an interest in their development. Exploration and staking were extended for a distance of 150 miles beyond Yellowknife Bay, and many new discoveries were reported. Extensive drilling programs have since been carried out on many properties, and where results warranted, underground development has been undertaken.

In the meantime, labour and supply conditions improved, and Negus Mines, Limited, reopened its mill in July, 1945. Gold production was resumed at the mill serving the Con and Rycon mines in August, 1946, and late in September, 1947, the first gold brick produced since 1942 was poured at the Thompson-Lundmark mine. Early in January, 1946, the Con and Negus mines undertook as a joint operation the drilling of a deep-drill hole on the Negus property which intersected the faulted Giant shear zone around the 2,000-foot level. The result of this operation is expected to lengthen greatly the life of the mines concerned.

By the end of 1947, the staking of new ground had slackened in favour of systematic prospecting of claim groups. This included standard and X-ray diamond drilling as well as geological examination and mapping. The most important area, the Yellowknife Bay-River region, contains the gold-producing Con-Rycon and Negus mines, and the Giant mine where production commenced on June 2, 1948, with the official opening August 24, 1948. At both the Con and Negus properties shafts have been deepened, and cross-cutting intersected the Giant shear extension, commonly termed the Campbell Zone. Two shafts have been completed at the Giant property and a third shaft collared. In addition a modern mill has been erected, powered by the Snare River Hydro Electric Power Plant, which was officially opened October 4, 1948. At the Akaitcho property, which adjoins that of Giant to the north, extensive ore bodies have been outlined by diamond drilling, a shaft collared and shaft-sinking will follow the erection of a steel head frame on the property. Extensive development, including the sinking of a shaft, was undertaken at Crestaurum Mines, Limited, 7 miles north of Giant, before work was suspended in 1947. In the Thompson-Hearne Lake area, the Thompson-Lundmark mine is producing gold from its Kim and Treasure Island veins. Shaft-sinking was undertaken at the Sunset mine in the Beaulieu River area, and also at the properties of Discovery Yellowknife and Viking Yellowknife Gold Mines Limited in the Giaque-Quyta Lake area. To the north, in the Indin Lake area, Diversified Mining Interests have completed shaft-sinking with some lateral development undertaken. Diamond drilling, trenching and other development work was also being carried on in the Gordon Lake, MacKay-Courageous Lakes, Ghost Lake, Russell-Slemon Lakes, and Regan Lake areas.

The Northwest Territories are now yielding the concentrates of radium and uranium, as well as gold, silver, and petroleum products in commercial quantities. Other minerals known to occur include lead, zinc, nickel, copper, tungsten, tantalum, beryllium, lithium, and coal.

A large quantity of fair grade lead-zinc ore was revealed by drilling and underground exploration some years ago south of Pine Point on Great

Slave Lake. As the further development of this area necessitated large capital expenditure, a 500 square mile concession was granted by the Dominion Government jointly to the Consolidated Mining and Smelting Company of Canada, Limited, and Ventures Limited, as these companies were technically and financially capable of undertaking a long-range prospecting program with a view to discovery of further deposits of lead and zinc, and the development of such deposits. Favourable progress in drilling operations has been reported from this area.

In other areas active exploration has indicated showings of promise. The high cost of production and transportation will be favourably affected by the new Hydro Electric Power development and the now completed Grimshaw-Hay River Road. Development work has been carried out on tantalum-bearing properties near Ross Lake, about 30 miles northeast of Yellowknife, where Peg Tantalum Mines Limited has erected a small mill, and on Hearne Channel of Great Slave Lake, where DeSteffany Tantalum-Beryllium Mines Limited has done considerable development work, including the erection of a 25-ton test mill. Occurrences of scheelite, the tungsten-bearing mineral, have been examined in the Tibbitt Lake, Beaulieu River, Gilmour Lake, and Gordon Lake areas. A nickel-cobalt occurrence, situated at Sachowia Lake, north of Et-Then Island in Great Slave Lake, has also been examined. Interest in the occurrences of copper in the Coppermine Mountains region was revived when American Metals Corporation undertook diamond drilling operations near Willow Creek, west of the Coppermine River, in 1944 and 1945. The results obtained, however, did not justify further development of the deposits. A more complete description of mineral occurrences in the Northwest Territories will be found in the section on geology on pages 37-42 inclusive.

A sequel to the mining activity in the Yellowknife region has been the development of the settlement of Yellowknife, on the west side of Yellowknife Bay, which now contains many of the conveniences and amenities of a modern town. In 1945 and 1946, additional townsite areas were surveyed to meet the needs of an increasing population. Recent developments included the installation of telephone, water, and sewage services, and the construction of a modern hospital, school, hotel, and theatres, as well as many new homes. (A separate publication describing the settlement of Yellowknife may be obtained on application from the Northwest Territories Service, Department of Mines and Resources, at Ottawa).

The Yellowknife Mining District covers an immense area, and many localities have been prospected casually or not at all. Although thousands of claims have been staked in the past four years, a great many await geological examination. The development of mining in the Northwest Territories has been aided greatly by the geological investigations and mapping work completed by the Geological Survey Division, Department of Mines and Resources, Ottawa. Geological reconnaissance in the Territories during the war years was restricted by the limited staff available and the urgent need for investigation elsewhere, but a broadened program of exploration is now under way. Accurate mapping is an essential adjunct to detailed mineral exploration, and additional areas of Canada's northland are now being photographed and mapped with the active co-operation of the Royal Canadian Air Force.

Mining interest has increased in the Arctic and Hudson Bay Mining District of the Northwest Territories. Most recent staking has occurred in the Nueltin Lake area where 193 claims have been recorded by the Hudson Bay Exploration and Development Company Limited. Previously

58 claims were recorded in the Ennadai Lake area by the Don Cameron Exploration Co. Limited; 40 new claims were staked last autumn at the Belcher Islands by the Belcher Islands Iron Mines Limited, adjacent to their previous stakings in that area.

This year an underwater reservation of 60 square miles in area was granted to Gulf Lead Mines Limited, an Ontario company holding a large concession at Richmond Gulf in New Quebec. This reservation was granted in the public interest by the Dominion Government as recent diamond drilling by the company indicated that the ore deposits are likely to extend under the waters of Hudson Bay and it might be that such submarine deposits would prove the deciding factor as to whether it will be possible to establish a base metal industry in the area.

According to figures released by the Dominion Bureau of Statistics at Ottawa, the value of mineral production in the Northwest Territories was as follows:

	1944	1945	1946	1947	Total Production to end of 1947
Gold.....	\$799,838	\$333,218	\$860,685	\$2,188,095	\$17,392,399
Silver.....	5,881	956	5,113	32,655	875,291
Lead.....	—	—	—	—	490
Copper.....	1,428	—	—	—	24,102
Tungsten.....	—	—	—	—	37,674
Crude Petroleum	632,587	136,303	173,392	500,238	2,318,734
Natural Gas.....	335	335	335	335	3,930
	\$1,440,069	\$470,812	\$1,039,525	\$2,721,323	\$20,652,620

WATER-POWER RESOURCES AND DEVELOPMENT*

IN RECENT YEARS, aerial photographic surveys and mapping and geological explorations designed to stimulate mineral development have greatly increased the amount and reliability of the information concerning the topography of the Northwest Territories. Many important rivers and lakes have been mapped and reasonably accurate records of the available heads have been secured. A beginning has been made also on the more accurate power surveys necessary before development of a water-power site can take place.

A power survey of the Yellowknife River was made in 1937, and a tentative scheme of development was worked out. Consolidated Mining and Smelting Company applied for the right to develop a site between Bluefish and Prosperous Lakes, about 20 miles north of Yellowknife settlement. The

* Revised in the Dominion Water and Power Bureau, Department of Mines and Resources, Ottawa

initial stage of this development, completed in 1940, was the first water-power project to be brought into operation in the Northwest Territories. The development consists of a dam at the outlet of Bluefish Lake which raises the water 15 feet, and a power-house near Prosperous Lake to which the water is diverted from the upper lake about one-half mile across the divide by means of an open cut a rock tunnel, and a woodstave penstock. The power equipment consists of a turbine rated at 4,700 horse-power and a generator of 4,200 kilovoltampere capacity. Delivery of power from this source was commenced on January 15, 1941, over the 33,000-volt transmission line to the Con-Rycon and Negus mines. This line also served the Ptarmigan mine during the period in which the latter was operated. Power from the project is utilized for distribution in the Yellowknife settlement, and a separate transmission line, 27 miles in length, supplies power to the Thompson-Lundmark mine east of the Yellowknife River.

As a result of increasing mining activity in the Yellowknife district in 1945, the need for additional power to operate properties under development became apparent. As the Bluefish-Prosperous Lakes power plant of Consolidated was not capable of taking on further loads, reconnaissance surveys of the Snare, Emile, Marion, and Lockhart Rivers were made by the Dominion Water and Power Bureau, and permanent gauging stations established on the Snare and Lockhart Rivers. Power surveys were also made on the Snare River system by Giant Yellowknife Gold Mines, Limited, with the object of undertaking a hydro-electric development capable of meeting the power requirements of the company.

Early in 1946, the Minister of Mines and Resources was authorized by Order in Council to enter into an agreement with Giant Yellowknife Gold Mines, Limited, and to undertake the construction, on the Snare River, of the initial stage of a power development capable of meeting the immediate requirements of the Yellowknife Mining District. Following a thorough examination of the site by competent engineers, the Department of Mines and Resources, through the Dominion Water and Power Bureau, awarded contracts for the construction of the dam and power-house, and placed orders for the manufacture of power equipment. The initial stage of the new development, situated at the outlet of Big Spruce Lake on the Snare River, about 90 miles northwest of Yellowknife settlement, will have a capacity of 8,000 horse-power under an average head of 56 feet. When required, second and third stages of the development are possible.

Work on the project was commenced in the spring of 1946, and by March, 1947, the main power tunnel, 136 feet in length, and a small tunnel to carry water to the exciter generators had been completed. In addition, a cofferdam across the northwest channel was constructed, and open cuts leading to the main tunnel and to the site of the power-house were excavated. A considerable amount of construction equipment and supplies, including two steel intake gates, was hauled to the site during the winter of 1946-47, and, during the summer of 1947, progress in the construction of the main dam was made; additional supplies, including power-house equipment, were landed at Yellowknife for transportation to the power-site during the winter of 1947-48. At the time this publication went to press, the plant had been officially opened and limited service to consumers had commenced.

Giant Yellowknife Gold Mines, Limited, has undertaken the construction of the transmission line from the power-house on the Snare River to the company's main camp about 3 miles north of the Yellowknife settlement. After completion, the transmission line will be acquired by the Department of Mines and Resources at cost. Distribution and sale of power to residents

of Yellowknife and to mining companies in the vicinity will be undertaken by a hydro-electric power commission which is being established.

Large areas of Mackenzie District have been surveyed by aerial methods in recent years so that the drainage areas of the principal rivers may be closely defined and the locations of falls and rapids definitely established. In the districts in which mining and prospecting operations have been more active, the actual drop in a number of the falls and rapids has been measured in the course of reconnaissance power investigations or geological and other surveys. In vast areas tributary to Hudson Bay and the Arctic Ocean, however, information on the rivers is limited to reports by a few travellers.

In general, owing to the inaccessibility, lack of development, and sparsity of population of the Territories, little precise information on stream flow has been accumulated. A number of miscellaneous stream measurements have been made on some of the rivers, but the only stream flow record of any length is that of the Yellowknife River above Prosperous Lake, where the record is practically continuous from 1937 to date. In estimating the power available on many of the rivers, it is necessary to assume run-off factors based on drainage areas.

From the limited information available, tentative estimates indicate a total of 362,700 horse-power available under conditions of ordinary minimum flow and 772,000 horse-power ordinarily available for six months of the year. This is considered to be a minimum estimate as, in general, it covers only the more important rivers and those sites concerning which some more or less definite information has been received; it is subject to revision as more precise data become available. Of the total available power, as stated, only 4,700 horse-power has been developed, although a further 8,000 horse-power is expected to be added during 1948.

From present knowledge, one of the most attractive rivers in the Territories from the view-point of water-power development is the Lockhart, which discharges into the eastern end of Great Slave Lake, and on which a reconnaissance survey was made in 1947. This river has a fall of 118 feet in the 30-mile stretch between Mackay and Aylmer Lakes, and 660 feet in the 20-mile section between Artillery and Great Slave Lakes. Two sites on the upper river are estimated to be capable of small developments, but the potential capacity of the lower river is estimated at 125,000 horse-power. Any development, however, would involve lengthy transmission lines to existing power markets.

The rivers flowing into Great Slave Lake from the south are less favoured with lake storage reservoirs, and winter run-off is low. The Taltson-Tazin River system, which enters Great Slave Lake from the south, has many rapids and falls, the Twin Gorge fall on the Taltson, with a natural fall of 90 feet and a reported feasible developed head of 120 feet, being particularly notable. The total power resources of the River are estimated to be about 200,000 horse-power. A portion of the flow of the upper Tazin was diverted south into Lake Athabaska for a power development near Gold-fields, Saskatchewan, which, however, is not at present being operated. There are also smaller power possibilities on the Hay, Snowdrift, and Kakisa Rivers perhaps totalling 50,000 horse-power at ordinary six months flow.

Where it cuts through the Franklin Mountains, the Great Bear River has rapids which afford a power head of about 25 feet. The vast area of Great Bear Lake is available to equalize the flow and allow production of roughly 30,000 horse-power of firm power. Tributary to Great Bear Lake is the Camsell River, upon which surveys have been made with a view to power

development for mining purposes. At White Eagle Falls, a head of 70 feet can be realized. This would produce 4,000 horse-power at estimated minimum flow and in excess of 6,000 horse-power with regulation on the series of lakes immediately upstream.

The western tributaries of the Mackenzie River below Great Slave Lake are mountainous streams with a steep gradient offering numerous power sites, but little storage is available to supplement low winter flow. At Virginia Falls on the South Nahanni River there is a descent of over 300 feet having a power capacity estimated at 5,000 to 12,500 horse-power. Other possible power sites are believed to exist on the Liard and Peel Rivers.

Some of the rivers flowing into the Arctic Ocean, including the Coppermine and Back Rivers, appear to have considerable power possibilities. Flow measurements were undertaken on the Coppermine River in 1947, but detailed information is lacking for proper appraisal. This also applies to the rivers flowing into Hudson Bay. It has been estimated that 18,500 horse-power might be developed at Bloody Falls on the Coppermine under a head of 80 feet. The Dubawnt River appears to have a power capacity of over 200,000 horse-power covering eight listed sites.

At the southern edge of the Northwest Territories, on the Slave River above Fort Smith, where there is a drop of 110 feet in 18 miles, it is estimated that from 220,000 to 506,000 horse-power could be developed at two concentrations; most of this power is in Alberta, but it would be readily available for use in the Northwest Territories.

THE FUR INDUSTRY

THE FUR TRADE in the Northwest Territories had its beginning in the latter part of the seventeenth century, when the Hudson's Bay Company received its charter from Charles II to trade into these northern regions. From then until 1939, when the value of furs was exceeded by that of minerals, fur trading continued to be the most important industry in the Territories. The trapping of fine furs is still, and is likely to continue to be, the chief occupation of most of the native population. Trading posts are scattered throughout the Territories and the history of the vast region is intimately associated with that of the fur trade.

The expeditions of Hearne in 1770-72 and Mackenzie in 1789 opened up new territory for the early traders, and the fur trade expanded rapidly. A chain of posts was established by the North West Trading Company along the Mackenzie waterways at intervals of about 150 to 200 miles. This system was continued and expanded by the Hudson's Bay Company, following the amalgamation of the two companies in 1821. The forts or trading posts were situated in strategic places, and later became the nuclei of some of the present settlements. The same conditions prevailed along the coasts of the Eastern Arctic, where the Revillon Frères Trading Company and the Hudson's Bay Company operated until the latter company absorbed the former in 1935-36. In the Eastern Arctic, most of the independent trading companies have retired from the field, leaving the greater part of the fur trade in possession of the Hudson's Bay Company. In Mackenzie District, however, independent traders operate in competition with the latter company.

Annual Yield

In total value, the Arctic (white) fox usually leads other kinds of pelts taken annually in the Northwest Territories. Chief among the other furs of economic importance are muskrat, beaver, mink, lynx, and red fox in its

three colour phases — red, cross, and silver. Smaller numbers of marten, ermine (weasel), otter, squirrel, wolf, wolverine, and bear are also taken.

The value of fur production in the Territories during the past five years, as determined by the Dominion Bureau of Statistics, is as follows (year ended June 30):

Year	No. Pelts Taken	Value
1941-42.....	445,336	\$2,840,701
1942-43.....	385,440	3,165,107
1943-44.....	297,633	2,199,132
1944-45.....	258,931	1,743,710
1945-46.....	565,065	2,750,183

Natural fluctuations in the numbers of the various species of wildlife influence the fur yield. These fluctuations are being carefully studied by the Dominion Government in co-operation with the Bureau of Animal Population at Oxford University, and much information is being obtained in an endeavour to ascertain their causes.

Native Game Preserves

Native game preserves have been established in the Northwest Territories to assist in maintaining the basic industry of the native population. The right to trap within these preserves is confined to Indians and Eskimos and to half-breeds leading the life of natives, with the exception of such white trappers as were already operating when the areas were set aside as preserves. A list of these preserves follows:

Name	Date Established	Area in Square Miles
Yellowknife.....	Sept. 22, 1923	70,000
Slave River.....	" " "	2,152
Peel River.....	" " "	3,300
Arctic Islands (land area).....	July 19, 1926	772,302
Mackenzie Mountains.....	May 3, 1938	69,440
		<hr/> 917,194

Other steps have been taken by the Northwest Territories Administration to maintain the fur industry and to preserve species in danger of extinction. Hunting and trapping are prohibited in the Thelon and Twin Islands Game Sanctuaries. Thelon Game Sanctuary is situated in eastern Mackenzie District and extends into Keewatin District. It has an area of 15,000 square miles and contains the largest herd of musk-ox remaining on the mainland of North America. Twin Islands Game Sanctuary, situated in James Bay, has an area of 55 square miles.

Wood Buffalo Park, with an area of 17,300 square miles, of which 3,625 square miles are in the Northwest Territories, was established mainly for the preservation of a herd of wood bison or buffalo. The park now forms a vast preserve for many other species of big game and fur-bearing animals. In the establishment of the park, the protection and increase, not only of buffalo but of other game species, were intended. Consequently, in keeping with a policy of strict conservation, travellers to the region must obtain permission to enter the park from the Superintendent of Forest and Wildlife Management at Fort Smith. Indians, half-breeds, and whites who trapped within the area before the park was established are permitted to hunt and trap under licence. The buffalo are rigidly protected.

Wildlife Management

Some years ago, the serious depletion of the wildlife of the Northwest Territories forced the decision to restrict the issue of hunting and trapping licences to British subjects who, prior to May 3, 1938, had taken up perma-

inent residence in the Northwest Territories and who were dependent upon hunting and trapping for a living. The wildlife resources have not increased everywhere since that time, because of drought conditions and forest fires which destroyed a large part of the forest cover.

The Northwest Territories Administration made substantial progress in the establishment of a forest and game protective service during the period 1945-48, and the problems of wildlife resources management are now under intensive investigation. The native population is also being encouraged to observe conservation practices.

A summary of the Game Regulations for the Northwest Territories will be found on page 63.

THE REINDEER INDUSTRY

THE CANADIAN GOVERNMENT, through the Northwest Territories Administration, has continued its effort to establish reindeer herding as an industry for the natives in northern parts of the Dominion. This undertaking was intended to broaden the basis of subsistence of the Eskimos and Indians, and to conserve the natural resources on which they depend. The industry was commenced in March, 1935, when a herd of 2,370 semi-domesticated reindeer driven overland from northwestern Alaska was delivered to a reserved area of 6,600 square miles in the Northwest Territories on the east side of the Mackenzie delta. The reindeer have become adapted to their new environment, and have increased substantially in numbers.

The reindeer industry was established in Canada following the study by a Royal Commission of the possibilities of developing reindeer and musk-ox herds. In its report of 1922, the Commission recommended that experimental herds of reindeer be placed in selected locations, and in the period 1926-28 the Dominion Government undertook a reconnaissance of the area lying along the Arctic Coast between the Yukon-Alaska boundary and the Coppermine River and north of Great Bear Lake. The investigations were made by A. E. Porsild, an experienced botanist, assisted by his brother, R. T. Porsild. Prior to the study of the Canadian range, the investigators visited Alaska to observe the conditions under which reindeer were handled.

In 1929, arrangements were made for the purchase of 3,000 reindeer, which were delivered by an Alaskan reindeer company to a selected range in Canada near the mouth of the Mackenzie River. The range was later established as a reindeer reserve. The herd selected for the overland drive by A.E. Porsild consisted of 2,890 does, 307 bucks, and 250 steers, the latter being for food and draught purposes. The drive was in charge of Andrew Bahr, veteran Lapp reindeer herder, who was assisted by a number of other Lapps and several Eskimos. Many difficulties were encountered. Some of the animals returned to their home range. Blizzards, intense cold, wolves, straying, accidents, and other obstacles impeded progress. The losses to the herd were severe, but these were recouped to some extent by the fawn crop each year. The reindeer arrived in Canadian territory in 1933, but the crossing of the Mackenzie River to the reserve, delayed by difficult weather and ice conditions, was not effected until the winter of 1934-35.

Meanwhile preparation for the reception of the herd had been made. A corral was constructed at Kittigazuit on the Arctic Coast, and buildings were erected for the accommodation of the reindeer staff and supplies. The headquarters station for the supervision of the reindeer field-work is about 40 miles inland on the right bank of the east channel of the Mackenzie River,

at the foot of the Caribou Hills, latitude 68° 41' N; longitude 134° 07' W. It is about 40 miles by air and 75 miles by water from Aklavik. Improvements have been carried out at the station since it was constructed, and, in 1938, radio equipment was installed to provide communication with the Northwest Territories Administration at Ottawa. Messages are relayed by the Royal Canadian Corps of Signals unit at Aklavik.

The corrals used for the annual round-up of the main herd are now located on Richards Island, the principal summer range. Here the animals are counted and classified about the end of July. The fawns are marked, breeding stock is properly proportioned, and the animals surplus to requirements are selected for slaughter later in the year. During the period of development, 1935-1947, large quantities of reindeer products, chiefly meat and hides, were utilized by the herders and others directly connected with the reindeer industry. Substantial donations of reindeer meat were made to mission hospitals and residential schools which care for the native population. Surplus products were sold to white and native residents of the region. Some of the skins of adult reindeer taken for meat were shipped to the Eastern Arctic, where they were urgently needed for use by the natives in lieu of caribou hides for the manufacture of winter clothing and for bedding.

The training of young natives in reindeer work proceeded steadily, and branch herds were established in 1938 and 1940 under native management. The reindeer comprising the native herds were entrusted to Eskimos who had served as apprentice herders. They received the deer under a lending arrangement subject to the return of a similar number of animals as the herds increased in size. A serious setback, however, occurred in 1944, when the native proprietors of these herds, with members of their families and a white supervisor, lost their lives in the wreck of a native schooner in a storm off the Arctic Coast. The reindeer which had been herded by these natives became scattered, and those that could be reassembled have since been herded as a Government unit in the Anderson River area.

At the round-ups held in the summer of 1947, there were more than 4,200 deer in the main herd located on the reserve, and about 2,000 head in the subsidiary herd near the Anderson River. These animals are the nucleus from which native herds may be established.

The handling of the reindeer at the annual round-ups and other occasions and the presence of herders at all times tends to prevent the animals from becoming wild and difficult to control. Some of the mature steers in the herds are trained to harness for transporting supplies and firewood, moving the herd camp, and similar work. The use of reindeer milk from Canadian herds is negligible at present. This practice requires the roping of the does, an impractical procedure in the case of large herds.

The reindeer migrate in spring from the inland winter ranges to the summer feeding grounds in the coast area, and return to the winter ranges in the early winter. The winter feed is principally reindeer moss, but in the summer the diet includes a variety of vegetation including grasses, shrubs, and sedges. One of the reasons why the reindeer move to the coast in the summer is to escape from insect pests, which are less numerous there because of the winds from the Arctic Ocean.

The extent to which reindeer herding may be developed in northern Canada depends largely on whether sufficient numbers of the natives accept the herders' mode of life. The abundant fur yield and high fur prices in recent years have tended to attract young, intelligent natives to the occupation of trapping rather than to the more monotonous life of a herder. As a result

there is a scarcity of herders, and the development of a group of natives able to manage reindeer herds and sell their surplus products to other residents of the region has been retarded.

The Northwest Territories Council and an Inter-departmental Committee on Northern Agriculture have studied the problems related to the development of the reindeer industry in Canada, and, in 1947, two qualified investigators visited the Reindeer Station and inspected the herds and the range. They reported the animals to be in a healthy condition, with an abundance of suitable pasturage available. Recommendations by these officers for improvements in herd and range management are receiving careful study and attention.

The general supervision of the reindeer industry is now part of the responsibility of the Superintendent of Forest and Wildlife Management in Mackenzie District. He is assisted by a Superintendent of the Reindeer Range Station, an experienced foreman, and a staff of labourers and herders, most of whom are Eskimos.

AGRICULTURE

AGRICULTURAL DEVELOPMENT in the Northwest Territories has been limited to the valleys of the Mackenzie River and some of its tributaries. Climatic, geological, and topographical conditions place the major part of the Territories outside the zone of possible agricultural operations. This is particularly true of the Eastern Arctic region, where lack of developed soil and shortness of the growing season are contributing factors.

Small-scale farming operations and gardening, however, have been carried on in Mackenzie District since the earliest days of exploration and settlement. Much of the pioneer work was undertaken by missionaries and fur-traders, who planted vegetables for their own use, imported a few head of live stock and horses, and even succeeded in growing small quantities of grain for feed.

By 1826, gardens were kept at all Hudson's Bay Company posts as far north as Fort Good Hope. Garden trials were undertaken for the Department of Agriculture by the Oblate missions of the Roman Catholic Church in 1911 at a number of settlements along the Mackenzie River, including Fort Smith, Fort Resolution, and Fort Providence, and later at Fort Good Hope.

These trials, continued until 1940, indicated that reasonably good crops of hardy vegetables, especially potatoes, could be obtained in most seasons. Occasional trips down the Mackenzie River were also taken by the superintendents of the Department of Agriculture experimental station at Beaverlodge, Alberta.

In January, 1943, an Inter-departmental Committee, composed of representatives of the Departments of Agriculture and Mines and Resources, was formed to assist in the improvement and promotion of agriculture in the Northwest Territories and Yukon. On the recommendation of the committee, field investigations, including soil and horticultural surveys, were undertaken in Mackenzie District in 1944 and 1945.

Investigations of soil conditions along the Slave, Liard, and Mackenzie Rivers were made by a soils specialist. In addition, most of the settlements along the Slave and Mackenzie Rivers were visited by a specialist in horticulture, who organized comprehensive trials with vegetable and flower seeds as well as fertilizer. Advice was furnished to residents engaged in

gardening, and a number of these selected as co-operators were given samples of seeds, roots, and plants suitable for northern latitudes. In addition, intensive experiments in growing field and garden crops on several types of soils in the vicinity of Yellowknife were undertaken in 1945.

Reports of the soil survey indicated that, although there are no extensive areas suitable for agricultural purposes in the Liard River Valley, river bottom land suitable for gardening and small scale farming occurs practically continuously along the river from a point about 60 miles above Fort Simpson to the British Columbia boundary. In the aggregate, the area of such lands would total many thousands of acres, but the development would entail heavy clearing operations. The settlement of Fort Simpson, situated at the junction of the Liard and Mackenzie Rivers, is located on an island of good soil, but the surrounding mainland regions offer little opportunity for agricultural development. From Simpson southward to Trout River, no large areas suitable for agriculture were seen, but from Trout River to Fort Smith large areas of low-lying land, probably of alluvial deposition, occur. Some of this land is believed suitable for agricultural development, particularly near the mouths of tributary streams and along the lower reaches of the Slave River, but heavy clearing operations will be entailed here as well.

The horticultural survey revealed considerable success in the raising of vegetables for local consumption. Improved yields, however, are believed possible by the planting of earlier-maturing varieties of seed, more extensive use of fertilizers, and irrigation where the soil lacks moisture or rainfall is scanty. From Fort Simpson northwards, some areas suitable for agriculture were observed on bench lands bordering the Mackenzie River and in the vicinity of existing settlements.

As a result of these surveys, plans were made for the establishment of experimental substations at Fort Simpson and Yellowknife. An experienced agriculturist was appointed to take charge of the Fort Simpson station in late 1946, and experimental work was commenced in 1947. This included the brushing, breaking, and cropping of land, and the construction of necessary buildings. Vegetable trials under the direction of a graduate horticulturist were also made on the two main types of soils in the vicinity of Yellowknife. The officer in charge of the Fort Simpson substation visits various settlements along the Mackenzie River and assists those engaged in agricultural activities.

The following brief notes on present conditions at the various settlements are based on recent observations of qualified investigators.

Fort Smith — Fort Smith is situated on sandy soil once covered by poplar and jack pine. The use of fertilizer and water improves yields. A number of gardens produce good root and leaf vegetables. Strawberry, raspberry, and other small fruit bushes bear fair crops. Dairy cattle, poultry, and horses are maintained in the vicinity. Wheat and oats grown by the Roman Catholic mission ripen and are used for feed. Wild hay is available in the vicinity.

Fort Resolution — Most of the common vegetables can be grown here with fair success. Potatoes have yielded 200 bushels to the acre in good years. Good oat crops have been obtained for feed; alfalfa and sweet clover plots have done well. A small herd of cattle is kept at the Roman Catholic mission farm.

Hay River — Soil at Hay River is black silt loam overlying sand. Summer climate is windy and dry. The Anglican mission garden has produced potatoes, celery, turnips, carrots, radishes, green tomatoes, and occasionally fodder corn.

Fort Providence — Horticulture has been carried on here since 1867. Potatoes, cabbage, lettuce, and radishes are grown, and tomatoes have ripened out of doors. Horses, cattle, and poultry are kept at the Roman Catholic mission.

Trout River — Many varieties of garden vegetables are grown on a small farm and potatoes are shipped in quantity to places farther north. The soil is a black clay loam.

Yellowknife — Although areas suitable for horticulture are not numerous, several gardens in the vicinity produce good vegetable crops. Most of these lie between the rock ridges characteristic of the region. The soil is generally clay which is overlaid with loam and moss and requires irrigation as rainfall is light. Varieties grown outdoors include potatoes, cabbage, cauliflower, broccoli, spinach, lettuce, radishes, carrots, turnips, beets, peas, and rhubarb. Poultry is raised, and, with the aid of heat and light, eggs are produced throughout the winter. There is a good market for local produce and two market gardeners operate with considerable success.

Fort Simpson — Live stock raising has been carried on at Fort Simpson for years. Brome grass, oats, and barley are grown for feed. Experimental tests carried on by a resident in co-operation with the Department of Agriculture for some years are being continued at a new experimental Substation. Potatoes and root crops usually give fine yields, and syrup has been made from sugar beets grown locally. Vegetable crops include peas, radishes, lettuce, cauliflower, cabbage, beets, carrots, rhubarb, and spinach.

Fort Liard — Gardens are situated on river terrace land, and produce potatoes and other vegetables. Tomatoes also ripen regularly.

Fort Norman — Gardens have been cultivated for years. With sufficient rainfall, good crops of cabbage, potatoes, lettuce, carrots, beets, and peas are obtained. Some poultry, brought in as chicks, is also kept by residents.

Norman Wells — Several gardens situated on bench land above the Mackenzie River produce good leaf crops, in addition to radishes and potatoes. The soil is basically clay loam.

Fort Good Hope — Small gardens do well at this settlement, which is situated just 20 miles south of the Arctic Circle. Leaf crops, potatoes, and root crops are practicable. Wild raspberries and gooseberries are very plentiful.

Arctic Red River — A few small gardens are situated on high, well drained loam soil. Root crops, potatoes, cabbage, cauliflower, peas, and lettuce grow well.

Fort McPherson — A garden at the Anglican mission produces good crops of leaf and root vegetables, including cabbage, cauliflower, and rhubarb. Tomatoes, squash, and marrow are also grown in a small greenhouse. Poultry is raised from imported chicks and the eggs are sold. Cereal grains have also made good growth and barley has ripened.

Aklavik — At Aklavik, more than 100 miles north of the Arctic Circle, gardens of alluvial soil produce leaf vegetables, carrots, turnips, beets, potatoes. The use of fertilizer increases yield. Tomatoes thrive and ripen in greenhouses. Some residents keep poultry raised from imported chicks, on imported feed. An experiment in dairy farming undertaken by a former Government medical officer at Aklavik was discontinued when the doctor left the settlement. Goats, however, are kept by another resident of the district, and a good supply of milk is obtained from them.

In addition to garden crops, both annual and perennial flowers thrive at most settlements. The best results are obtained from the transplanting of seedlings. Experiments now being carried on by co-operators are expected to assist in determining the best varieties for various locations.

In view of the shortness of the open season, the frost hazard, danger of drought, limited facilities for transportation, and other unfavourable conditions, the achievements outlined above are significant. However, much of the success attained is due to the diligent work of those concerned.

It is believed that cropping in Mackenzie District will be confined essentially to the sedimentary lowland. Most of the soils of agricultural value are the products of alluvial deposit and water assortment. Of the land from Fort Simpson northward, the creek valleys are considered to be the most suitable for the raising of farm produce. There is much muskeg, but this is sometimes capable of successful cultivation. Back from the main streams, much of the Mackenzie Valley has been repeatedly fire-swept. Large areas may be expected to represent a rather inferior class of woodland soil.

A characteristic of the lower Mackenzie region is permanently frozen subsoil. Forest and field crops grow above permanent frost. In parts of Siberia, agriculture is carried on above subsoil frozen to a depth of many hundred feet. The length of day affects crops variously according to their specific habits. The potato responds favourably to a long day with a low temperature.

Although agriculture is impractical in the Eastern Arctic, a number of Government officials, traders, and missionaries grow vegetable plots under glass, using imported soil and fertilizers. At Chesterfield on Hudson Bay, salad vegetables have been grown successfully on a small plot of native soil without the aid of glass, and poultry has been raised for the production of fresh eggs.

Experienced observers are in agreement that before any part of the north is opened for agriculture, conditions should be carefully studied and the most likely areas selected. If, then, settlement commences along the river fronts, working gradually back and utilizing the safer locations for the less hardy crops, frost may be combated with the best chances of success. Ultimately it may be possible to introduce poultry and domestic cattle to these new locations, to grow field crops to some extent, and to operate profitable gardens almost to the Arctic Ocean.

GENERAL INFORMATION

Opportunities for Employment

THE MINING INDUSTRY and, to a lesser degree, associated developments, offer most of the opportunities for employment in the Northwest Territories. A National Employment Office has been established at Yellowknife by the Department of Labour, and its manager is actively in touch with those able to offer employment in the district. In addition, the National Employment Service at Edmonton, Alberta, and the Agent of the Northwest Territories Administration, whose office is in the McLeod Building, Edmonton, possess reliable information about employment conditions in the Mackenzie District. Men employed in the mining industry must be in first class physical condition, and must undergo a medical examination before being hired.

Business Opportunities

There are limited opportunities for commercial enterprises in the Territories, and, in districts such as Yellowknife, such opportunities correspond with expansion of the mining industry. Those planning to enter business at

Yellowknife or other settlements are urged to visit the proposed site and canvass the situation beforehand. Lumber and building materials are still in short supply, and transportation costs are high.

Supplies and Commodities

Most foodstuffs, other than fresh fruit and vegetables, are imported during the summer months when lower freight rates are offered by water transportation. Unexpected growth in population affects supplies, which, in the event of shortage, must be replenished by use of tractor train or aircraft at increased cost. The cost of living at settlements in the Northwest Territories is much higher than in the provinces, principally on account of transportation costs.

Fresh vegetables are grown and may be purchased at many of the settlements in Mackenzie District during the summer months. Practically all dairy products, however, are imported, and condensed or evaporated milk is used almost exclusively. Some eggs are produced and sold at Yellowknife and other points along the Mackenzie River system. Both wood and oil are used for fuel, although oil is gradually replacing wood in the larger settlements. Fuel oil sells for about 30 cents a gallon at Yellowknife.

Immigration Requirements

Citizens of the United States or other countries desiring to engage in business or take employment in the Northwest Territories should apply to the Director, Immigration Branch, Department of Mines and Resources, Ottawa, for information concerning immigration requirements.

Maps

Topographical maps of the Northwest Territories on various scales may be obtained at nominal cost from the Surveys and Mapping Bureau, Department of Mines and Resources, at Ottawa. Geological maps of mineral areas are available at the Geological Survey of Canada, Department of Mines and Resources, Ottawa. Map index sheets or lists of available maps may be obtained free of charge from these services.

General

Requests for general information concerning all matters relating to the Northwest Territories should be addressed to the Northwest Territories and Yukon Services, Lands and Development Services Branch, Department of Mines and Resources, Ottawa.

INFORMATION CONCERNING THE ADMINISTRATION OF CROWN LANDS, TIMBER, GRAZING, AND HAY

Lands in the Northwest Territories are administered by the Department of Mines and Resources under the Dominion Lands Act.

Except for the lots comprising the various settlements, lands in the Northwest Territories are not surveyed, and consequently are not open to purchase. Lands selected for some particular purpose may be purchased after survey is made at the expense of the buyer.

Small tracts of unsurveyed land for fur-farming and agricultural purposes and for use in connection with fishing operations or other business purposes may be obtained by lease. The application fee is \$10 and the minimum annual rental is 50 cents per acre. Annual rental for each lease is based on the acreage, the nature and location of the land, and the purpose for which the land is to be used. Leases so granted cover the surface rights only and do not give the lessee any claim to minerals.

In some of the surveyed settlements, lots are disposed of by sale to transportation companies, traders, and missions in connection with their undertakings, and to settlers for residential or business purposes. None of these lots is looked upon as having agricultural value.

Under the Timber Regulations, annual permits are granted for the cutting of timber, subject to payment of a permit fee of \$1; payment of dues as set out in the Regulations; and to the payment of annual ground rental at the rate of \$100 per square mile where the cut is to exceed 100 cords or where timber is required for sawmill purposes.

Grazing leases and permits to cut hay on vacant Crown lands may be obtained under provisions of the Hay and Grazing Regulations.

Applications for land, timber, hay, or grazing privileges should be filed with the Agent of Dominion Lands at Fort Smith, Northwest Territories, or if the lands affected are in the vicinity of Yellowknife settlement, with the Agent of Dominion Lands at Yellowknife, Northwest Territories.

Copies of Timber, Hay, and Grazing Regulations may be obtained from the Agents of Dominion Lands at Fort Smith or Yellowknife, Northwest Territories, or from the Lands Division, Lands and Development Services Branch, Department of Mines and Resources, Ottawa, Canada.

SUMMARY OF QUARTZ MINING REGULATIONS

A summary of the regulations governing the disposal of quartz mining claims on Dominion Lands in the Northwest Territories follows:

Miner's Licences — Any person 18 years of age and over, and any joint stock company incorporated or licensed to do business in Canada, is eligible, on payment of the prescribed fee, to obtain a miner's licence. The annual fee for an individual miner's licence is \$5; for companies, according to the schedule as set out in the regulations. Individual licences may be obtained from the Mining Recorders and Sub-mining Recorders in the Northwest Territories and at Edmonton, Alberta, or from the Lands and Development Services Branch, Department of Mines and Resources, Ottawa. Company licences are obtainable only at Ottawa.

Number of Claims which may be staked by licensee — Each licensee may, in any one mining division and in any one licence year (April 1 — March 31), stake and record six (6) claims for himself and six (6) claims each for two other licensees (proxies), or a total of eighteen claims.

Size of Claims — Not to exceed 1,500 feet in length by 1,500 feet in breadth, with boundaries running as nearly as possible north, south, east, and west, and all angles to be as nearly right angles as possible. The total area of the claim should not exceed 51·65 acres. Claims to be marked on the ground with four legal posts, number one post to be placed at northeast corner. Boundary lines between each post to be marked out by removal of trees, brush, and obstructions, and by blazing trees at each side of and adjoining such boundary lines. Prospectors are urged to exercise care in planting claim posts and in cutting and marking boundary lines, and are also warned of the penalties which may be incurred in connection with oversized claims.

Recording — Application for the granting of a claim must be made on the prescribed form to the Mining Recorder or Sub-mining Recorder for the district within fifteen days of staking if claim is located within ten miles of the office of the said Recorder or Sub-mining Recorder. An extra day is allowed for each additional ten miles or fraction thereof. The fee for recording a claim is \$5, if recorded on staker's licence; if recorded on behalf of another licensee, the fee is \$10 per claim.

Grouping — Adjoining claims not exceeding thirty-six in number may be grouped for the purpose of representation work. Fee for grouping certificate, \$5.

Representation work — Claims may be held for a period of one year and thence from year to year, without the necessity of re-recording, provided that representation (development) work to the value of \$100 is performed on the claim each year and the owner renews his miner's licence annually. In general, after work to the value of \$500, including cost of survey of the claim, has been performed, and other conditions met, a lease covering a period of 21 years may be applied for.

Other Mining Regulations

In addition to the foregoing, copies of regulations governing the disposal of the following rights on Dominion Lands are available: *Placer Mining; Coal; Dredging; Petroleum and Natural Gas; Quarrying; Sand, Stone, and Gravel.*

Copies of all Mining Regulations may be obtained from the Mining Recorders at Fort Smith and Yellowknife, N. W. T., or from the Northwest Territories Service, Lands and Development Services Branch, Department of Mines and Resources, Ottawa, Canada.

SUMMARY OF THE GAME REGULATIONS

HUNTING AND TRAPPING in the Northwest Territories are controlled by the provisions of the Northwest Game Act and Regulations. The wildlife resources of the Territories are limited, and as the native Indians, Eskimos, and half-breeds are dependent upon hunting and trapping for a livelihood, the issue of licences for these activities is restricted.

Hunting and Trapping Licences

Licences to hunt and trap may be issued to the following persons only:—

- (1) Residents of the Northwest Territories, as defined by Regulations, *who on May 3, 1938, held hunting and trapping licences and who continue to reside in the Northwest Territories.*
- (2) The children of those who have had their domicile in the Northwest Territories for the past four years, provided such children continue to reside in the Northwest Territories.
- (3) Such other persons as the Commissioner of the Northwest Territories may decide are equally entitled to licences under these regulations.

(NOTE) — Only British subjects with four years' residence in the Northwest Territories are eligible for licences under Clause 2.

A minor under the age of fourteen years shall not be eligible for a licence. A minor, assisting his parents or guardians in connection with hunting or trapping operations, will not require a licence:

Wildlife conditions have been aggravated by forest fires, and reduced precipitation has lowered water-levels, resulting in dried-up streams and lakes where wildlife formerly was abundant. As a result, the trapping of beaver and marten is restricted.

A licence to shoot game birds during the open season may be issued to any person who is ineligible for the regular hunting and trapping licence. The fees for game bird licences shall be:—

(a) For resident British subjects	\$2.00
(b) For non-resident British subjects	5.00
(c) For other non-residents	10.00

The Northwest Territories Game Regulations make provision whereby explorers, surveyors, or projectors engaged in any exploration, survey of mining operations, or other examination of the Territories may take or kill moose, caribou, and non-migratory birds such as ptarmigan if *in dire need of such game for food*. For the purpose of the regulations, *in dire need* means the shortage of food making it essential to kill such game for fresh meat (*food*) in order to sustain life or prevent starvation.

Copies of the Regulations respecting Game in the Northwest Territories may be obtained on application to the Northwest Territories and Yukon Services, Lands and Development Services Branch, Department of Mines and Resources, Ottawa, Canada.

SUMMARY OF SPORT FISHING REGULATIONS

Angling in waters of the Northwest Territories by residents and non-residents is permitted without licence.

Fishing is prohibited each year for the undernoted species of fish as follows:

Lake (salmon) trout — September 16 to November 30.

Pike and pickerel (walleye) — April 1 to May 15.

The use of spears, lights, firearms, and dynamite or other explosive material in killing fish is prohibited.

The use of bare, unbaited hooks or grapnels is prohibited.

Provision is made in the fishing regulations whereby explorers, prospectors, surveyors, or travellers, while engaged in exploration, mining, or survey operations, or other examination of the Northwest Territories, may fish at any time without a licence, but with legal implements, for their own domestic use.

Special regulations govern commercial fishing in the Territories.

Additional information, including copies of the Regulations governing Fishing in the Northwest Territories, may be obtained from the Department of Fisheries, Ottawa, Canada.

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COUNTLESS BOOKS, reports, articles, and papers dealing with the Northwest Territories have been published since the earliest days of exploration. The following selected bibliography, which includes some of the more recent releases of Canadian Government departments, may provide the reader with additional information. A number of these include extensive bibliographies.

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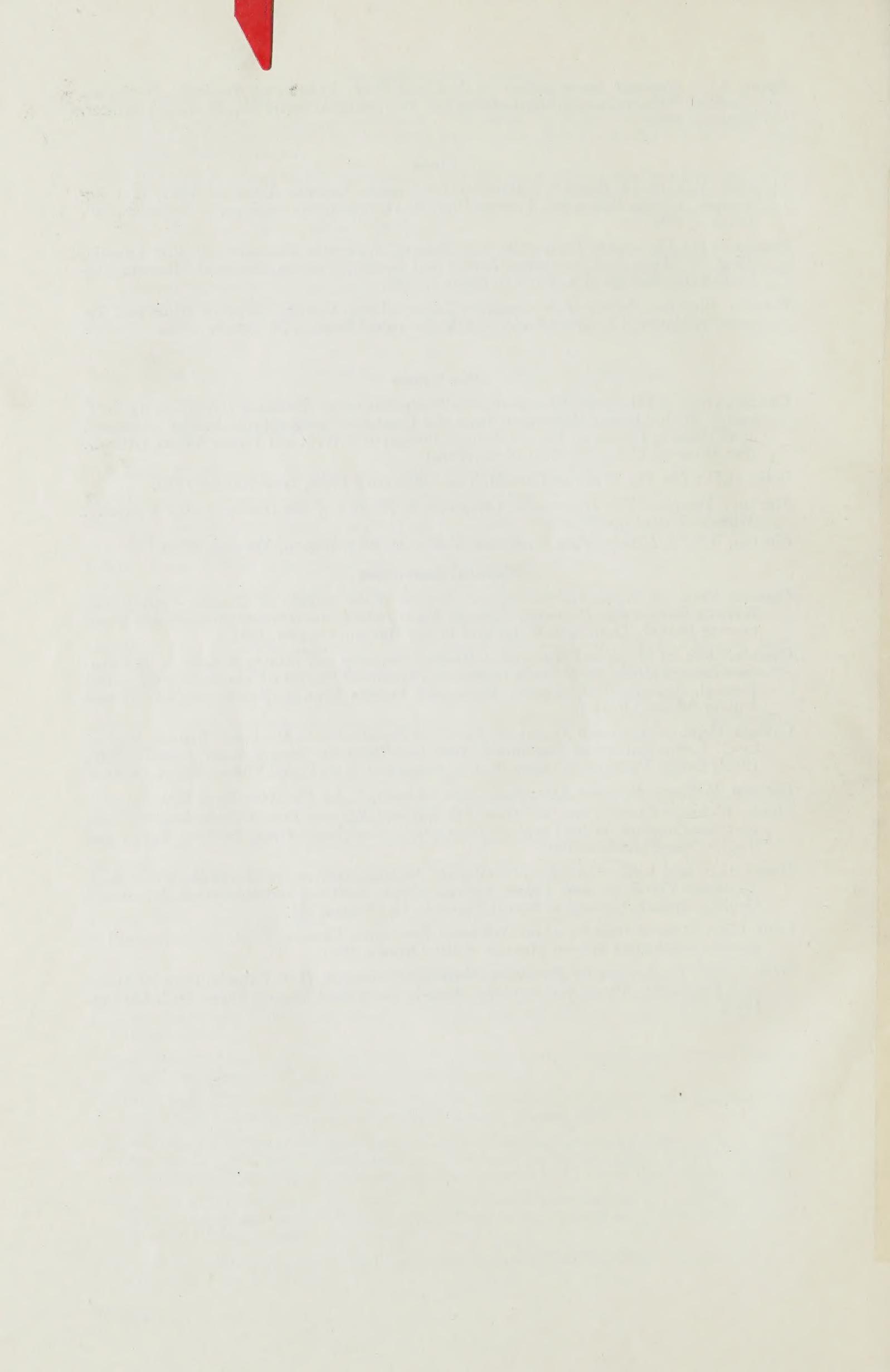
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*Eastern Arctic Patrol
vessel pushing through
pan ice in
Lancaster Sound.*



*A group of Eskimo
women and children
at Pangnirtung,
southern Baffin Island.*

*Eskimos unloading
freight from supply
vessel at Chesterfield
on Hudson Bay.*



THE NORTHWEST TERRITORIES



**ADMINISTRATION, RESOURCES AND
DEVELOPMENT**